

FRIDAY, JULY 4.

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Contributions.

The Introduction of Broad Rails.

NEW YORK, June 26, 1890.

To the Editor of the Railroad Gazette.

Possibly some of your readers have observed and car give definite experience in cases similar to the follow

A road which has been using light rail with a narrow head, say 2½ in., replaces it, for a portion of its line, with heavier rail, 2½ in. width of head. The wheel treads have become worn to the narrower rail, and when on the broad rail are in reality running chiefly on the outer unworn ¼ in., causing the new rail to flake on the outer edge and giving an unfair test of its qualities. This flaking of the rail head will on tangent be on both rails; on curve it will be chiefly on one rail.

If this injurious action takes place as suggested, is it not bad practice to introduce heavy rail gradually and for small portions of a line of road, since the larger per-centage of old rail will keep the treads worn to the nar-rower width?

Archibald A. Schenck.

The M. M. Committee on Exhaust Nozzles.

Richmond & Danville Railroad Co., ALEXANDRIA, Va., June 30, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the report on exhaust pipes, etc., read at Old Point Comfort, I note that the name of the Chairman of the Committee was omitted. This was because the report was set up in type before the arrival of Mr. C. F. Thomas the Chairman, who agreed with the rest of the committee and read the report.

The members of the committee have agreed that the only way of determining the value of different patterns of exhaust pipes and stacks will be to devise an indicator by which they can at the same time take cards from the smoke box and cylinders. Then by making changes in one proportion at a time we may be able to arrive at some idea of the real action of the exhaust steam. Whether an indicator can be made to give correct indi-cations under the extremely rapid fluctuations which occur in the smoke box is a matter of some doubt, which experiment only can solve.

A. W. Gibbs,

Member of Committee.

Some Observations on Block Signaling.

Abstract of a paper read before the ninth annual meeting of the Association of Railway Telegraph Superintendents at Niagara Falls, N. Y., June 19, 1890, by W. W. Wichols, Superintendent of Telegraph, Chicago, Burlington & Quincy.

I had an opportunity some time ago to examine closely the workings of many block systems throughout the country, and was much interested in noting the wide differences in important details in the manipulation of the [block?] signals. In one case the adoption of the uniform code produced a fatal accident before the crews were familiarized with the signals. But what surprised me more was the glaring inconsistency which appeared in the block system in one or two cases; an inconsistency which in one instance held a man responsible for a certain condition of things and yet took away from him the knowledge upon which his responsibility depended.

The model block system must be throughout simple, uniform and consistent. Simplicity demands that along the route of a railroad no more signals should be used than are absolutely necessary. It has been claimed that an interlocking switch signal must never be used as a block signal, even when the interlocking switch station is one with the block station, because their significance is entirely distinct—the former indicates a condition of the track alone, while the latter pertains more to the relative position of the traffic. But the fewer signals we have the be'tel. A large number of signals at any one point where high speed is desirable tends to confusion. Whe'ter the block signal shall ever be a train order boar may roads if the train order board is displayed for a

train, an order must be forthcoming before the train leaves. The spacing of trains by a block signal, which is also a train order signal, must necessarily modify this significance to a considerable extent, and this modification upon single track roads would be subject to serious objections. These can, however, be avoided by either of two ways—by giving a clearance card whenever a train is stopped by the block signal, or by separating the signals completely, insisting that wherever the two signals are separated, the semaphore (assuming that to be the standard form for block signals) is never to be used as a train order board, and a block station is never to be located at a train order station. I think all will agree that the former plan is perfectly practical, simpler than the latter and just as effective.

A question which appears to be much discussed is that regarding the proper time of placing a signal to danger (after it has indicated clear) to protect the entering train. Practice in this particular varies more than in any other, and reaches great extremes. Different systems throw the signal anywhere from two car lengths behind the departing train. When thrown in front of the engine it is assumed that it is desirable for the engine must osee the signal go to danger in order that he may know that the rear of his train is protected. As to this it may be said that the engineman of a train is not specially concerned with the protection of its rear. His function is distinct and pertains to the advance of the train alone, just as the protection of the rear, when occasion demands, is the trainman's function; a function with which, by the way, the model system must not interfere nor in any way affect; flagging should be performed as strictly within the blocked section as outside of it.

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with which, by the way, the model system must not interfere nor in any way affect; flagging should be performed as strictly within the blocked section as outside of it.

To raise the signal immediately behind the engine is sometimes considered necessary in order to prevent collisions between trains following each other closely under permissive signaling. In many places, converging points in large cities for instance, an absolute block except on a very elaborate and expensive scale is impracticable, consequently trains are often run permissively; and although the cautionary signal warns the approaching train of the presence of another in the block ahead, nevertheless circumstances often compel the maintenance of a comparatively high rate of speed. It frequently happens in yards that a signal can be clearly seen by a second train before the first train (for which it is displayed) has accepted and used it; under these circumstances it is claimed that there always exists a danger from rear collisions because the engineman will maintain a high speed as long as he sees the clear signal, on which he keeps his eye, oblivious of the train ahead. When only a home semaphore is used, to throw it to danger immediately behind the engine would here seem advisable; but to use a home signal alone renders any block system woefully incomplete.

The best results are only attainable when the home signal is placed at danger after the entire train has passed. The basis for my belief may be explained as follows: Every road provides for the joint responsibility of train and enginemen. They have been compelled in the past to acknowledge the possibility that an engineman affected with absent-mindedness, or something akin to it, will run by signals set against him. If long experience has proven this joint responsibility a necessity in the case of train order boards, then in what does the block signal differ that it should be treated otherwise? Why should it require an accident to teach us the similarity in the two signals? Some railroads

the "break-in-two" signal to the engineman of the parted train, who handles the forward section according to rule.

In accordance with the above conclusions the model system should fulfill the following requirements: 1. It should be at all times and at all stations an absolute block.

2. It should be worked with semaphore signals, in conformance with a plan which shall give each block a distant signal, controlled by a home signal interlocked with it; the distant to be raised immediately behind the engine; the home not until the entire train has passed. 3. It should, as far as possible, include all signals along the route which are used in moving trains, on the main track, and therefore all interlocking switch stations should be incorporated into and form a part of the system. 4. Separate train-order boards should be avoided by the employment of clearance cards. 5. Where the relative position of block station and passenger depot or other stopping point render it necessary, starting or advance signals should be provided to avoid running by a home signal at danger to reach the point of detention.

Before closing I would like to call attention to two points in signaling which are too often overlooked. One is the necessity of placing the signal post directly over, or to the right of, the governed track, with semaphore blades invariably to the right of the post. The other is the placing of the home signal arms governing the main tracks so that there shall never be more than two on one post; the top arm everywhere to govern the through route, the bottom to indicate a diverging one. Where this post holds the distant signal for the home signal of the block ahead, it would be best to place the home and distant (both of which refer to main route) above and treat the blade for the diverging route as an auxiliary, to be placed below the two main line signals.

DISCUSSION.

In the discussion on this paper Mr. G. L. LANG (N. Y. & N. E.) inquired if it would not be best to have the signal turn in the face of the engineer. Automatic signals are sometimes fused by lightning, and for this reason the Boston & Providence road had found it best to arrange them so that the engineman could see that they had moved properly.

Mr. C. A. DARLTON replied that the automatic signal bould turn in front of the engine, but the manual signal

Mr. C. A. Darlton replied that the automatic signal should turn in front of the engine, but the manual signal should not.

Mr. J. B. Stewart (West Shore) added that the engineman needed to see that the signal did not turn so as to know there was trouble, but with the hand signal this was not necessary as the operator would know it was out of order and use a flag.

Mr. Nichols replied that he had discussed this matter with many prominent officers in New England and Pennsylvania. Mr. Chesley, of the Boston & Albary, said that there they held the enginemen alone responsible for the safety of the train. They had discontinued throwing the signal ahead of the train.

Mr. Lang thought it would be impossible for a conductor to attend properly to his duties and know anything about the position of signals.

Mr. Nichols explained that the rear brakeman was the person who should look out for the signals. He never leaves his post and should never pass a signal. On some roads he is designated as a flagman and is paid more than other brakemen.

Mr. J. B. Stewart inquired if any member had experienced difficulty in their operators noting the markers. He understood that on the Lake Shore the number of the train was carried on the caboose.

Mr. W. F. Taylon (Pennsylvania) said that the number of the train was carried on the caboose.

Mr. W. F. Taylon (Pennsylvania) said that the number of the train was rot indicated on the Pansylvania. The operators were required to notice the markers. They also depend on the rear brakeman. On the Pittsburgh division they have the rule that the engineman and fireman shall call the signal to each other. That is an auxiliary. They want every man to feel his responsibility, but that may be supplemented. It did not appear necessary to mark the train. The train is known by the number of the engine.

Mr. Nichols said that it was absolutely impossible to properly handle a non-automatic system without a check. On the Chicago, Burlington & Quincy a man is placed in charge of the block operators. He is co

New Railroad Construction in 1890.

The table published herewith shows the new track laid during the first half of the calendar year in the United States, Canada and Mexico. The lines under construction, or for which contracts have been let, are also given, as well as those only surveyed or projected. This last class of enterprises has been made more full than in our previous tables, and it doubtless contains a larger proportion of lines which will not reach the con-struction stage than have the previous tables. The new track laid, divided by states, is as follows:

Alabama	78.5 New York 4.3
Arizona Ter	3.3 North Carolina 164.4
Arkansas	40. Ohio 7.
California	1. Pennsylvania 65.7
Colorado	26. South Carolina 102.
Florida	91.8 South Dakota 1.5
Georgia	183. Tennessee 149.5
Illinois	71. Texas 44.
Indian Ter	98.4 Utah Ter 2.
Kansas	57.3 Virginia 102.
Kentucky	74. Washington 106.5
Louisana	10. Wisconsin 16.
Maine	12.
Maryland	30. Total, U. S
Massachusetts	1.5
Michigan	44.1 Manitoba 7.5
Minnesota	2. Ontario 18.
Mississippi	45. Northwest Ter 48.4
Missouri	34. Mexico 234:
Montana	124.8
Nebraska	70. Total, Foreign 307.9
New Jersey	36. Grand Total2,206.5

American Society of Civil Engineers' Convention of 1890.

The Annual Convention of the American Society of Civil Engineers began at the Mountain House, Cresson, Pa., Thursday, June 26. For many of the members it actually began Wednesday morning, as a large party went from New York, Philadelphia and Harrisburg by a special train running as a second section of the Pennsylvania "limited." The first session was called to order by Mr. W. P. Shinn, the President, and Mr. William Metcalf, of Pittsburgh, was elected Chairman of the convention

After the customary announcements by the Secretary the reading of papers was begun with one on the Designing and Erection of the Oakley Arch, by Mr. J. Foster ing and Erection of the Oakley Arch, by Mr. J. Foster Crowell. This is a very carefully written and thorough paper, describing an arch, 42 degrees 30 minutes, skew, carrying the Baltimore & Ohio Southwestern over the Cincinnati & Richmond at Oakley, O. The direct span is 28 ft., the oblique span 41.44 ft. and the length 80.18 ft., to carry a double track embankment. The difference in grade of the two roads is 20 ft., but the upper grade will ultimately be raised 11 ft. more. The helicoidal method of treatment was adopted.

In the discussion which followed Mr. D. J. Whittemore asked what would have been the comparative cost of

asked what would have been the comparative cost of the arch and of a plate girder bridge, with buckle plate floor, for the same service. Mr. Crowell replied that it seemed desirable to build the bridge with refer-ence to the ultimate raising of the grade over it. Further, he had considered the relative cost of the two forms of structure and found that the difference was less than would be supposed. Abutments for a plate girder bridge would necessarily have been higher than for the arch, the base larger, and, therefore, in that part of the structure the amount of masonry would have been increased. Mr. Crowell was called upon in the discussion to further explain his position that a skew from 40 to 45 degrees gives the least secure conditions. Considerable discussion was had as to the relative advantages of the discussion was had as to the relative advantages of the helicoidal arch and of offsetted ribs. Mr. Crowell ex-plained why the cost would actually be less in the case of a properly-designed helicoidal arch. There is considerable saving in the amount of masonry. The stone cut-

NEW RAILROAD CONSTRUCTION-JANUARY 1 TO JULY 1, 1890.

NAME OF ROAD.	Track laid bety	ween Jan. 1 and July 1.		Under conti	ract or construction.		Under sur	rvey or projected.	
MANE OF BOAD.	From.	To.	Miles.	From.	То.	Miles.	From.	To.	Mil
bbeville & Waycrossddison & Pennsylvania	Abbeville, Ga	House Creek, Ga	13	House Creek	Swan, Ga	23.	Swan	Waycross, Ga	49
abama, Georgia & Florida							Quincy, Fla Lumpkin	Lumpkin, Ga Birmingham, Ala	100 155
abama Midland	Sprague June., Ala	Troy, Ala	9	Montgomery, Ala Rutlege, Ala	Maplesville, Ala Julian, Ala	49	Maplesville	Tuscaloosa, Ala Tillamock, Or	70
lbany & Astorialbany, Florida & Northernlbemarle & Pantego	End of track	Pantego, N. C Bell Haven, N. C. Johnson's Mill, Pa	4.5	Plymouth, N. C	East	6	Albany, Gr	Cordele, Ga	35
lleghany & Kinzualton, Venice & East St Louis			4.5 2.5	Branch. Johnson's Mill.	Freck's Mill	3 7	Alton, Ill.	East St. Louis	30
tion, venice & East & Louis. thona & Wapsononock mherstburg, L. Shore & Blenheim. miston & Atlantic				Sylacausa, Ala	Shelby, Ala	20	Alton, Ill	Fallen Timber, Pa Blenheim, Ont	18
nniston & Montgomery	•••••						Anniston, Ala Anson, Tex	Montgomery, Ala Abilene, Tex	. 25
nson & Abilene. rkansas & Gulf. rkansas Midland. sheville & Bristol. storia & South Coast.		• • • • • • • • • • • • • • • • • • • •					Pendleton, Ark Main Line Asheville, N. C	Lake Village, Ark South Bristol, Tenn	15
storia & South Coast.				Astoria, Or.	Seaside, Or.	18	Clatsop June, Or	Hillsboro, Or.	8
chison, Topeka & Santa Fe lanta, Alpharetta & Blue Ridge. lantic & Danville	Mayo, Va	Near Milton, N. C	12	Ardmore, I. T	Coal Mines		Atlanta	Alpharetta, Ga	2
Danville & East Tennessee	Mayo, Va Buffalo Junc., Va Belfield, Va	Hitchcock Mills	8		***************************************		Danville, Va	Bristol, Tenn.	17
tlantic, Gulf & Havana	Powell Ariz		3				St. Augustine, Fla	Daytona, Fla	
tlantic Coast Line: Wilmington & Weldon. ngusta, Tallahasse & Gulf ugusta & West Florida.	Greenville, N. C	Griffln, N. C	17	Griffin	Kingston, N.C	11	Kingston	Jacksonville, N. C Apalachicola, Fla	. 3
ugusta & West Florida ylmer & Port Burwell vie des Chaleurs				Augusta, Ga	Cross. Cent. of Ga Paspebiac, Que	53	Augusta, Ga Port Burwell, Ont Paspebiac, Que	Thomasville, Ga North Dorcester, Ont Gaspe.	. 18
altimore & Drum Pointltimore & Eastern Shore	St. Michael's, Md	Claiborne, Md	5	*Cascapedia, P. Que Baltimore, Md. Vienna, Md.	Drum Point, Md Salisbury, Md	80 17	raspeolae, Que		
altimore & Ohio: Akron & Chicago Junction	Easton Md	Vienna, Md	25	Akron, O	Chicago June., O	69			
eaver & Ellwood				Ellwood June., Pa	Elwood, Pa-	3	State College, Pa	Stone Valley, Pa	. 1
ungnam Bay & British Columbia ellton, Homer & Carnesville	wnatcom, Wash	Nooksack River.	13				Nooksack River Bellton, Ga Society Hill, S. C.	Carnesville Ga	. 1
ellingnam Bay & British Coulinds elliton, Homer & Carnesville nnettsville & Society Hill. rmingham, Jackson & Kan, City rmingham & Shade Mt. rming. Sheffleld & Tenn. River, ackville, Alston & Newberry.		Coult Design Ale			Divorton Ale	11	Jackson, Tenn Birmingham, Ala South Parish	Bennettsville, S. C Newberne, Tenn Shade Mt., Ala Warrior River.	. 1
			9.5	Margerum, Ala Anniston, Ala	Jacksonville, Ala.	17	Seivern, S. C	Batesburg, S. C	1:::
owling Green & Northern. ackett, Fort Clark & Rio Grande, antford, Waterloo & Lake Erie.							Bowling Green, Ky Brackett, Tex Waterford, Ont.	Falls of Rough, Ky Spotford Junc., Tex	. 1
ridgeport & Decatur							Waterford, Ont Decatur, Tex At Bristol, Tenn	Toronto, Ont Bridgeport, Tex Palmer Rapids, Ont.	. 1
ocky. Westport & S. Ste Marie affalo Dock & Connecting		• • • • • • • • • • • • • • • • • • • •		Newcastle, Wyo	Deadwood, S, D	107	Westport, Ont	Horse Creek	10
irkesville & Northwestern							W. Lincoln, Neb Burkesville, Ky	Havelock, Neb Horse Cave Ky Mt. Pleasant, N. C	. 1
barrus & Stanley che River Valleylifornia	Shotwell, N. C Fagan, N. C	Fagan. N. C Collinsville, N. C	9.3				Concord, N. C Collinsville	Grouel Hills, N. C	
lifornia	Mills College, Cal .	Leona, Cal	1	Leona	Meyer's Peak, Cal	1	Camden, Ark	El Dorado, Ark Rockland, Me	: 1
mden & Alexandria mden, Rockport & Rockland nadian Government Roads nadian Pacific	Souris, Man	Monteith, Man	7.5	Point Tupper. N. S Monteith	Grand Narrows, N. S. Melita, Man	46 34	Camden, Me	Glenboro, Man	:
Columbia & Kootenau	******************			Mission, B. C	Nelson, B. C.	20	Revelstoke, B. C	Valleyfield, Que Colville, W	- 17
Calgary & Edmonton Montreal & Western				St. Jerome, Que	Shawbridge Prince Albert	10	Calgary Alberta Shawbridge, P. Q	Edmonton. Le Desert, P. Q	
Shuswap & Okanagan	End of track	Saskatoon, N. W. T.	48.4	Wilmington, N. C	Southport	25	Sicamous, B. C	Okanagan Lake	x XX
pe Fear & Yadkin Valley	Mt. Airy, N. C	Flat Rock, N. C.	<u>2</u> 9	Mt. Airy, N. C	Salisbury, N. C State Line	186	Salisbury	Greenville, S. C.	
rollna Southern			20				Cheraw, S. C.	Sumter, S. C	
ntralia & Chester	Dombuoka Cla	Luona Co	42				Greenville, Ga	Newnan, Ga	
ntral Ontario rdan Valley	City of Mexico	San Angel, Mex	7				Coehill, Ont	Sudbury, Ont	. 2
ntral Ontario ntral Ontario rdan Valley earleston, Cincinnati & Chicago earleston, Sumter & Northern	Rutherfordton, N. C Eutawville, S. C.	End of track	16 6 6	Rutherfordton, N. C. Sumter, S. C.	Minneapolis, Va Marion, N. C Bennetsville, S. C	20 65			
nateaugay: Saranac & Lake Placid nattanooga, Gads. & Birm nattanooga, Rome & Columbus							Saranac Lake Gadsden, Ala	Lake Placid, N. Y	. 1
nattanooga, Rome & Columbus hattanooga Southern				Chattanooga, Tenn.	Gadsden, Ala		Carrollton (la	Leeds, Ala Columbus, Ga Walden's Ridge, Ten	
nattanooga Southern nattanooga Southern nattanooga Western nesapeake & Ohio nester, Lenoir & Darlington nisagga Ft Madion & Darlington							Clifton Forge, Va Bennettsville, S. C	Warm Springs, Va Darlington, S. C Albia, Ia	n
nicago, Ft. Madison & Des Moines nicago, Milwaukee & St. Paul: New Lisbon, Necedah & L. S'p'rio						10	. Dirininguam, 14		
nicago, Rock Island & Pacific		Minco, I. T.		. Lynn, Wis	Remington, Wis			Lincoln, Neb	
sleege St Daul & Wanges City	Okarche, I.T	Minco, I. T.	29 5		* ****************	*****		Leavenworth, Kan	
Leavenworth & St. Joseph bi., St. P., Minneapolis & Omaha. hicago & West Michigan. hoctaw Coal & Railway Co.	. Traverse City, Mich	Manistee River, Mich	36.6	. Neillsville, Wis	Marshfield, Wis			Petoskey, Mich	
hoctaw Coal & Railway Co	. La Fourche Maline		65				Tullahoma, Tenn	Huntsville, Ala West West end, Cin	. 2
ncinnati & Green River ncinnati Circular ncinnati, Wabash & Michigan ncinnati, Wheeling & New York.				Anderson Ind	Rushville, Ind	40	Red Bank, O	West end, Cin	
incinnati, Wheeling & New York, leveland & Canton							. Morgan, O	Freeport, OChagrin Falls, OColumbia, Ala	
incinnati, wheeling & New York, leveland & Canton. olumbia, Geneva & Western. olumbia, Newberry & Laurens. olumbus Southern olumbus, Lima & Milwaukee olumbus, Shawnee & Hocking. ooperstown & Charlotte Valley. oopprstown & Charlotte Valley.	Columbia, S. C Weston, Ga	Prosperity, S. C	36	Prosperity	Newberry, S. C.	7	Newberry	. Clinton, S. C	
olumbus, Lima & Milwaukee olumbus, Shawnee & Hocking	•			Saltillo, O	Deflance, O. Sayres, O. DavenportCentre, NY	43 11 3	Zanesville, O	Columbus, O Zanesville	
orpus Christi & South America orsicana & Southeastern.				ost Davenport, N.			. Corsicana, Tex	Brownsville, Tex Buffalo, Tex	
orsicana & Southeastern. ovington Transfer raig Mineral roton Valley. oudersport, Hornellsville & Lack				*Covington, Ky Eagle Rock, Va	Ludlow, Ky Newcastle, Va	25		Conn. State line Hornellsville, N. Y	
Coudersport, Galeton & Ansoni umberland Valley		************************			Sweden Valley		Sweden Valley Fort Loudon Fort Loudon	. Mt. Dallas, Pa	
ahlonega & Dawsonville	**************						Tate, Ga.	Newville, Pa Lula Junc	
anielsville arien Short Line ayton & Faunsdale eadwood Central	Belleville, Ga	Northwest	. 2	End of track *Dayton, Ala	Josselyn, Ga. Faunsdale, Ala Bald Mountain, S. D. Smelton, S. D.	30			
	**********			Deadwood, S. D	Bald Mountain, S. D. Smelton, S. D.	10		Decatur, Ala	
ecatur, Chesapeake & New Orlean elaware, Lackawanna & Wester lelaware River & Lancaster lelaware, Susq. & Schuylkili leming, Sierra Madre & Pacific enver Resort enver & Rio Grande	St. Peters, Pa	End of track	7	Bernardsville, N. J.	Peapack, N. J Kimberton, Pa	. 8	Kimberton	Lancaster, Pa	
elaware, Susq. & Schuylkill eming, Sierra Madre & Pacific. enver Resort		• • • • • • • • • • • • • • • • • • • •		Deming, N. M	Mexican lineLookout MtAlamosa, Col	40	Drifton, Pa	. Dowen, Pa	
on you & Die Grande				Villa Grove, Col	Alamosa, Col	. 55		Buena Vista, Col	. 1

NEW RAILROAD CONSTRUCTION-JANUARY 1 TO JULY 1, 1890.-Continued.

NAME OF BOAD	Track laid be	tween Jan. 1 and July 1	l.	Under contr	act or construction.		Under su	rv y or projected.	
NAME OF ROAD.	From.	To.	Miles.	From.	To.	Miles.	From.	To.	Miles
Detroit & St. Clair River Diamond Valley	Mooneyille De	Note Will Do					Detroit, Mich	St. Clair, Mich	46
Diamond Valley	Mooresville, Pa	. Nens Mill, Pa		Poughkeepsie, N. Y.	Honewell June. N. Y.	12	Statesboro, Ga	Waycross, Ga	90
outchess County but the Red Wing & Southern					Inter. line Dunderburg, Mt	150	Red Wing, Minn Inter, line	Duluth	155 90
ounderburg Spiral.				La Prairie, Minn Jones Point, N. Y Easton, Pa	Dunderburg, Mt Ashland, Pa	15 10	Charleston, S. C		
ast Shore Terminal Co	Diago Wanda Ala	Distant Ale	10	G Al-	D Ale	20	Charleston, S. C		3
Johnson C. & Carolinaau Claire, Miss. & Lake Superior,lkhart & Western	Piney woods, Ala	. Blocton, Ala		Johnson C. Tenn	Bessemer, Ala Bumpass Creek	15	Eau Claire, Wis	Winona, Minn	56
lkhart & Western				North Sewickley, Pa.	Rock Point, Pa	3	Elkhart, Ind	Mishawaka, Ind	11
llwood Short Line lmira, Cortland & Northern rie & Huron					****** ** ****************************		Camden, N. Y Dresden, Ont	Watertown, N. Y Sarnia, Ont	45 50
towah Valleyairhaven & Southern				Fairhaven, Wash Sedro, Wash Sedro	N. Westminster, B. C.	50	Gainesville, Ga Seattle	Kingston, Ga Tacoma, Wash	75
armville & Powhatan	Cunny Cide Vo	Farmville, Va		Sedro, Wash	Seattle, Wash	20 50	Seattle	Portland, Or	
incastle & Troutville							Fincastle, Va Florence, Ala	Troutville, Va Linden, Tenn	76
orida, Central & Peninsular orida Midland	Plant City, Fla	Tampa, Fla	22.5		**********				
rest City & Sloux City							Valdosta, Ga Forest City, S. D End of track.	Deadman's Bay, Fla Gettysburg, S. D Guntersville, Ala	85 16
ort Payne & Eastern ort Worth & Albuquerque ort Worth & Rio Grande		. East	8	Ft. Worth, Tex, Dublin, Tex,	Springtown, Tex Comauche, Tex	30 22	Ft. Worth	Young County, Tex Brady, Tex	30 100 70
anklin & Tilton	Knoxville, Tenn	Fountain Head	5.5						4
ench Broad Valley				Hendersonville, N. C. Asheville, N. C.	Broad River Transylvania Co. line	20 27	Transylvania Co. line	Tilton. S. C. State line	20
adsden & Attalla Union	Attalla	At Attalla, Ala Gadsden, Ala	6	Attalla	Gadsden Furn., Ala. Bl'ck Creek Falls, Ala	7			
enesis & Obed River							Sunbright, Tenn Warren, Me	Sunny Side, Tenn Union, Me Yazoo City, Miss	15
eorgia Pacificeorgia Southern & Florida	itta Bena, Miss	Tallahatchie River	30	End of track		40	Tifton Ga	Thomasville, Ga	45 52 159
Macon & Atlantic	Macon June., Ga		33	Culloden, Ga	La Grange, Ga	95	La Grange	Thomasville, Ga Savannah, Ga Birmingham, Ala Stevenson, Ala	130
ettysburg & Harrisburg							Macon La Grange Tallapoosa, Ala Gettysburg, Pa Goderich, Ont	Stevenson, Ala Washington, D. C Wingham, Ont	80 75 23
sorgia, Tenne-see & illinois. ettysburg & Harrisburg. derich & Pacific oodyear, Neillsville & Northern. rafton & Upton.	Goodyear, Wis Hopedale, Mass.	End of track Milford, Mass Parachute, Col	4.5 1.5	Goodyear, Wis	Millston, Wis	12	***************************************		
and Rapids, Chicago & St. Louis.	Rifle Creek, Col Great Falls, Mont	Parachute, Col	20		Grand Junction, Col.			Benton Harbor, Mich.	75
reat Falls & Canada.	Great Falls, Mont	North	25	End of track Sweet Grass Hills	Sweet G. Hills, Mont. Lethbridge, Alberta	110 70		***************************************	
reat Northern: Montana Central reat Northwest Central	Beulah, Mont	Monarch, Mont	30.8	Oak Lake, Man	Northwest	50	Brandon	Rattleford	350
reenfield & Northern				. Oak Lake, Man	Northwest		S. Greenfield, Mo	Battleford	36
reenville & Southeasternulf, Brazos Valley & Pacificulf, Shreveport & Kansas Cityrleys & Paint Rock Valleyuthrie, Reno City & Fort Reno							Greenville, Ala Henrietta, Tex	Elba, Ala	45
ulf, Shreveport & Kansas City urleys & Paint Rock Valley								South	50 60
MI MOOON							Fort Deposit Guthrie, I. T. Pioche, Nev	Fort Reno, I. T Mines	42
arlem & Appling	Harriman, Tenn		i i	Harriman	Mines	10	Harlem, Ga	Appling, Ga	. 10
ghland & St. Joseph ocking & Western				Harrisburg, Pa	Bowmansdale, Pa		Highland, Kan Chauncey, O	Ryan's Sta	90
omer & Susquehanna oosac Tunnel & Wilmington ornellsville & West Union							Homer, Pa	London, O	20
ornellsville & West Union ouston & Texas Central				Hutchins, Tex	Lancaster, Tex	5	Wilmington, Vt Hornelisville, N. Y	West Union, N. Y	16
utchinson & Southern: Omaha, Hutchinson & Gulf.	Kingman, Kan	South	30		Kan. State line	20	1		
aho North & South							De Lamar, Id. T Decatur, Ili	Long Valley, Id. T Be rdstown, Ill.	150
ondale, Bancroft & Ottawa	Vera Cruz, Mex	Jalapa, Mex Las Vegas	50 40 10		Direct Calca Cont		Pangroft Ont	Irondale, Ont	40
cksonville Southeastern Line hnsburg & Bradford	Litchfield, Ill	Irondale, Ont. Edwardsville, Ill	22	Irondale, Ont Edwardsville, Ill	E. St. Louis, Ill	27	Bancroft, Ont	Bradford Pa	55
pplin Beltanona & Prattsburg							Joplin, Mo Prattsburg, N. Y Kanona, N. Y	Grand Falls, Mo Stanley, N. Y.	20 20
			1				Belt Line	Bradford, Pa. Grand Falls, Mo. Stanley, N. Y. Hornellsville, N. Y. Kansas City, Mo. White Oaks, N. Mex. South	18
ansas City, El Paso & Mexican ansas City, Fort Smith & Southern							Lanoria Splitlog, Mo. Carbondale Quindaro, Mo. Kansas City, Mo. Second Str. K. C.	South.	156 78 130
ansas City Circular ansas City, El Paso & Mexican ansas City, Fort Smith & Southern ans. C., Lawrence & Wichita. ansas City Link. ansas City, Nevada & Fort Smith.							Quindaro, Mo	South Wichita, Kan Kansas City, Mo. Monett, Mo.	27 170
ansas City, Nevada & Fort Smith. ansas City Suburban Belt ansas City, Watkins & Gulf	Lake Charles La	South	10	End of track	toward Alex., La		Second Str. K. C	Kansas City	18
ennebec Centralentucky Midland	Randolph, Me	Togus, Me	5	******************				Saylersville, Ky	68
entucky Union	Lexington, Ky Kentucky River	Winchester, Ky Jackson, Ky	. 18				Paris. Jackson, Ky	Big Stone Gap	125
inderhook & Hudson							Kimbolton, O Hudson, N. Y	Mansfield, O. Kinderhook Sta., N.Y	17
ingston & Pembrokeinnickinnick.				Kinnickinnick, Ky Knoxville, Tenn Cumberland Gap, Ky.	Mines.	8	Renfrew, Ont	Eganville, Ont	23
noxville & Northeastern n'xville,Cumberland Gap & L'ville La Crosse, Black R. Falls & East		•• •••••••••		Cumberland Gap, Ky.	Middlesborough, Ky	3	La Crosse, Wis	Black R. Falls, Wis.	25
ake Shore & Michigan Southern: Toledo & Ohio Northern							Fayette, O	Chestertown, Ind	150
a Plata Coal & Iron Co		•• ••••••					Mines		
Buffalo & Geneva	Grand June., Col	Coal mines	. 5	In Rockland, Me	Geneva, N. Y	. 1		A.A	
ouisiana & Northwestern		**					Homer, La	Ark. state line	105
ville, Evansville & St. Louis Con.: Belleville, Centralia & Eastern	Centralia, Ill.	Belleville, Ill	49	Allone Mana	Contrary Pond, Tenn	90			
ouisville & Nashville Birmingham Mineral	Helena, Ala	Gurnee, Ala	10	Milldale, Ala	Mines	. 5			
ouisville, New Orleans & Texas ouisville, St. Louis & Texas:	Clarksdale, Miss	Hopson Bayou	15	End of track	Minter City, Miss	30			
<i>L'ville, Hardensburg & Western.</i> puisville Southern:					Falls of Rough, Ky				
Richmond, Nicholas, Ir. & B		Marble Creek, Ky	. 8	Versailles, Ky	Nicholasville Beattyville Rivière a Pierre, P.Q	. 16 . 57			
ower Laurentian ynchburg & Durham	South Boston, Va.	Flat River, N. C	. 29	Flat River	Durnam, N. C	70 21	Durham	Ral. & Aug. R. R.	25
acon & Dublinaine Central:							North Stratford, N. H	Hazens June. N. H.	1
Coos Valley anistee & Grand Rapi 18. anistee & Northeastern. anitoba & Northwestern.							Manistee, Mich Wesson C., Mich.	Hazens Junc., N. H. Grand Rapids, Mich. Manistee	110
anitoba & Southeastern					Yorkton, N. W. T	. 17	. Winnipeg, Man	Lake of Woods	80
anitoulin & North Shore					Pike's Peak, Col		Little Current	Nairn, Ont	
arietta & North Georgia:	Negro Creek	End of track	95	Hiawassee Riv'r Tenr	Knoxville, Tenn			9-41-9-30	
arlboro & Sudbury Lary Lee Coal & Iron Co ledina Valley				Lewisburg, Ala	Coal mines	. 5	. Marlboro, Mass . Lacoste	South Sudbury, Mass	8 6
edina Valleyemphis & Atlantic	Backward W	Dad -		West Point, Miss	Houston, Miss		Houston	. Memphis, Tenn	140
lemphis & Atlantic lexican lexican International lexican Southern	. rachucan, Mex	End of track	12	Pueble Wes	Tehuacan, Mex		Torreon, Mex	Durango, Mex	100 220
fichigan Central				Pueblo, Mex North Toledo, O	. W. Toledo, O	4	. Angangueo	Zitacuaro, Mex	25
Michoacan & Pacific Middleburg, Highland & L. Butler. Middle Georgia & Atlantic		Northwest	10	Middleburg, Fla Covington, Ga	Lake Butler, Fla Machen, Ga	. 25	Eatonton, Ga	Savannah, Ga	165
44 64 64		Little River, Ga		Covington, Ga Little River, Ga	Eatonton, Ga				

NEW RAILROAD CONSTRUCTION-JANUARY 1 TO JULY 1, 1890,-Continued.

NAME OF ROAD, dlesborough Belt	Wisconsin Central Herculancum, Mo	Sussex, Wis	Miles.		To. Bennetts Fork, Ky Cumb'nd Gap Tunnel Stoverdale, Pa	Miles. 6 3 7	From. Movrristown, Tenn	To.	Mil
dletown & Hummestown land Pacific en & Southern waukee Belt & Term waukee Northern: scanaba, Iron Ml. & Western scanaba, Iron Ml. & Western sissippi & Little Rock sissippi Hivor & Bonne Terre souri, Kansas & Texas: souri Panison & Dallas souri Panison & Dallas souri Panison & Dallas souri Panison & Gentler t. Scott & Eastern t. Scott Belt Ter ansas & Arkunsas Val. fouston, Cenl. Ark. & No souri, Tennessee & Georgia bile & Dauphin Island bile, Jackson & Kansas City will & Ohlo neton & Prince Edward Island nongahela & Chartiers herey & Mexican Gulf	Wisconsin Central Herculancum, Mo	Sussex, Wis	1.5	Thrift, Ga	Bennetts Fork, Ky Cumb'nd Gap Tunnel Stoverdale, Pa	6 3 7	Morrristown, Tenn		4
dletown & Hummestown land Pacific en & Southern waukee Belt & Term waukee Northern: scanaba, Iron Ml. & Western scanaba, Iron Ml. & Western sissippi & Little Rock sissippi Hivor & Bonne Terre souri, Kansas & Texas: souri Panison & Dallas souri Panison & Dallas souri Panison & Dallas souri Panison & Gentler t. Scott & Eastern t. Scott Belt Ter ansas & Arkunsas Val. fouston, Cenl. Ark. & No souri, Tennessee & Georgia bile & Dauphin Island bile, Jackson & Kansas City will & Ohlo neton & Prince Edward Island nongahela & Chartiers herey & Mexican Gulf	Wisconsin Central Herculancum, Mo	Sussex, Wis	1.5	Thrift, Ga	Stoverdale, Pa	3 7			
en & Southern. wankee & Northern: scanaba, Iron MI. & Western wankee & Northern: scanaba, Iron MI. & Western wankee. Menominee Falls & W. missippi & Little Rock sissippi River & Bonne Terre souri, Kansas & Texas; herman, Denison & Dallas souri Panison & Dallas souri Pacific: t. Scott & Eastern. t. Scott & Eastern. t. Scott Belt Ter. ansas & Arkansas Val. fouston, Cenl. Ark. & No. souri, Tennessee & Georgia bite & Dauphin Island bite, Jackson & Kansas City sile & Ohio. meton & Prince Edward Island anngahela & Chartiers. herey & Mexican Gulf.	Wisconsin Central Herculaneum, Mo		1.5				Sloux Falls, S. D	Pierre, SD	22
sissippi & Little Rock. sissippi Rivor & Bonne Terre souri, Kansas & Texas: herman, Denison & Dallas souri Parison & Dallas souri Parison & Dallas t. Scott & Eastern. t. Scott & Onlo. souri, Tennessee & Georgia bile & Dauphin Island bile, Jackson & Kansas City bile & Ohlo. scott & Chartiers. therety & Mexican Gulf	Herculaneum, Mo		1.5		Millen, Ga	11	Summit, Ga	South	25
sissippi & Little Rock. sissippi Rivor & Bonne Terre souri, Kansas & Texas: herman, Denison & Dallas souri Parison & Dallas souri Parison & Dallas t. Scott & Eastern. t. Scott & Onlo. souri, Tennessee & Georgia bile & Dauphin Island bile, Jackson & Kansas City bile & Ohlo. scott & Chartiers. therety & Mexican Gulf	Herculaneum, Mo		1.5	Escanaba, Mich	Crystal Falls, Mich	100	*****************		
nerman, Denison & Datus souri Pacific. t, Scott & Eastern. t; Scott Belt Ter. ansas & Arkansas Val. fouston, Cent. Ark. & No. souri, Tennessee & Georgia bile & Dauphin Island bile, Jackson & Kansas City bile & Ohio neton & Prince Edward Island nongahela & Chartiers. nterey & Mexican Gulf		River Side	43				Little Rock.	Duncan, Ark	6
nerman, Denison & Datus souri Pacific. t, Scott & Eastern. t; Scott Belt Ter. ansas & Arkansas Val. fouston, Cent. Ark. & No. souri, Tennessee & Georgia bile & Dauphin Island bile, Jackson & Kansas City bile & Ohio neton & Prince Edward Island nongahela & Chartiers. nterey & Mexican Gulf			2				Henrietta, Tex	Seymour, Tex	50
t, Scott & Eastern. t; Scott Belt Ter. ansas & Arkansas Val. fonston, Cent. Ark. & No. souri, Tennessee & Georgia bile & Dauphin Island bile, Jackson & Kansas City bile & Ohio. neton & Prince Edward Island nongahela & Chartiers. terey & Mexican Gulf.	Cherokee, Ind. Ter Dermott, Ark	Inc. 1 77111 37			Denison, Tex	10	Sherman, Tex	Dallas	50
nterey & Mexican Gulf	Dermott, Ark		3.9	Rich Hill	Tipton, Mo Jasper County, Mo	100	******	********	
nterey & Mexican Gulf		South	25	End of track	Mer Rouge, La	5 15 47	Humboldt, Tenn	Hickman, Ky	90
nterey & Mexican Gulf							Mobile, Ala	Mobile Bay	36 182
nterey & Mexican Gulf			******			******	Okolona, Miss Buctouche, P. E. I Peter's Creek, Pa	Richbucto, P. E. I Bridgeville, Pa	19 20 1
ant Moosilauke ant Pleasant & Seaview City	Monterey, Mex	Trevino, Mex Near Victoria, Mex Regaud, Ont.	66 59	Linares, Mex	Victoria, Mex	100	victoria	Tampico, Mex	13
unt Pleasant & Seaview City	Hudson, Ont	Reigaud, Ont					Rigaud Warren, N. H	Ottawa, Ont	6 2
haille Chattanogge & St Loni			******	Hog Island, S. C	Seaview City, S. C	9	Harrowsmith, Ont	Sydenham, Ont Pikeville, Tenn	'i
hville & Knoxville	Buffalo Valley, Tenn.	Cookeville, Tenn	22					Cin. Southern	
Albany Rolf & Torminal Co							Cookeville Chartiers, Pa New Albany, Ind St. John's, N. F.	Coraopolis, Pa Junc. K. & I. Bridge Hall's Bay	20
wfoundland w Orl., Ft. Jack. & Grand Isle w York Central & Hudson River: iag. Falls & La Salle w York, Ontario & Western.				End of track	Ft. Jackson, La	33	******************	***************************************	
v York, Ontario & Western	Hancock N V	Savanton Do	54				La Salle, N. Y	Niagara Falls, N. Y	
th & South Illinois	Honaker, Va	Bickley's Mills, Va	54 19	Bickley's Mills	Norton, Va	26	Elkhorn, W. Va Eureka, Ill Paul Smith's Sta	Ironton, O	19
thern Adirondackthern Pacific	Missoula, Mont	End of track	31			109	Seattle, Wash	Lake Washington	
61 66 66 67	End of track Sappington, Mont	Boulder, Mont Norris & Pony M	10 28	Durham, Wash	Mullan, Id Raging River Grand Coulee	18 30	Olympia, W	Gray's Harbor	
orthern Pacific & Manacoma, Olym. & G. Harbor		******************		Rounthwaite, Man.	Brandon, Man	72 10		***************************************	
				Lakeview, W	Gray's Harbor Chehalis, W	68	Middleton, N. S.	Margaretville, N. S.	
len & Hot Springs. lo & Mississippi: incinnati & Bedford. lo & Northwestern o Valley		***************************************		Odgen, Utah	Hot Springs, Utah	10			
incinnati & Bedford o & Northwestern		**********************		. Riverdale, Ind	Quarries	6	Sciotoville, O	Ironton, O.	13
Coleny							Princeton, Ky Hazlewood, Mass	Ironton, O	. 1
y Valley & Lehigh							Hazlewood, Mass Norwood, Mass No. Attleboro, Mass Birdsboro, Pa	Walpole, Mass Walpole, Mass	
y Valley & Lehigh pida, Oneonta & New York nge County nge & Keysville	Burnside, N. Y.	MaybrookJune.,N.Y	1.3				Birdsboro, Pa Oneida, N. Y Orange C. H., Va	Rittenhouse Gap, Pa Oneor a, N. Y. Keysville, Va	
nge & Keysvillegonian							Portland, Or Hunt's June, Wash.		
gonian gon & Washington Territory				Centralia, Wash Union, Or	Gray's Harbor Elgin, Or	57 28	Hunt's June, Wash.	Portland, Or	
ando & Winter Park: Sceola & Lake Jesupawa & Gatineau Valley	Osceola, Fla	Gabriella, Fla		Gabriella		. 5	Ottawa, Ont	Chelsea.	
ific Short Line	So. Sioux City, Neb.	Plainview	70	Plainview, Neb	O'Neill, Neb	127	O'Neil, Neb. Paducah, Ky	Ogden, Utah. Hickman, Ky. Florence, Ala. Moss Landing, Cal.	. 8
awa & Gatineau Valleyific Short Line.lucah, Hickman & Southernlucah Tennessee & Alaora Valley					Paris, Tenn	65	Watsonville, Cal	Florence, Ala Moss Landing, Cal	. 2
ry Sound Colonization	* *************************************						Apopka, Fla Emsdale, Ont	Parry Sound, Ont	
cos Valley nnsylvania, Lehigh & Eastern nnsylvania	Ambor Div	Drowns Wills N. I			Morrisville, Pa	90	Eddy, N. M Port Jervis, N. Y Freeport, Pa	Roswell, N. M Tomhicken, Pa Winfield, Pa	. 1
				Downington, Pa New Holland, Pa. utler Brauch Junc.	Lancaster, Pa	10	Freeport, Fa		
hio Valley				. Radebaugh Cr. Junc. Bellaire, O	. Little Sewickley, Pa.	8	Stewart, Pa		
" Nio Valley. Vaverly & New York Bay. Vaverly & Passaic. nna., Poughkeepsie & Boston. illips & Rangely. illips & Rangely.				Waverly, N. J Newark	Powhatan, O	6	Slatington, Pa		
illips & Rangelyiladelphia & Reading:				Phillips, Me	Rangeley, Me	28	Slatington, Pa	Harrisburg, Pa	
amden County	Mt Enbraim N I	LittleTimberCk N I	5		Spring Mills, N. J New Hope, Pa	8 16	** ************************************		
Vortheast Pennildelphia & Sea Shore	Winslow June., N. J.	Tuckahue, N. J	27	Tuckahoe, N. J	Sea Isle City, N. J Cape May	10 28			
edmont & Laney					Carey, O		Laney, Ala	Piedmont, Ala Roanoke, Ala	-
ttsford & Rutland mouth & Middleborort Arthur, Duluth & Western				. Akron, O			Center Rutland, Vt.	Rutland, Vt	
rt Arthur, Duluth & Western	* ***** *******************************			Post Clinton O	Fremont, O Marshfield, Wis	20	Kakabeka Junction	. Sand Lake, Ont	
rt Clinton Short Line. rt Edward, Centralia & Northeri rtland, Port Angeles & Victoria rt Townsend & Southern	n			Port Edwards, Wis.	Marshfield, Wis	. 30	Port Angeles, Wash	. Gray's Harbor	
				. End of track	Union City, W Quilicene, W	20 32	Quincene, w	Union City	
ebec Central ebec & Lake St. John incy, Keokuk & Chicago leigh Springs. pid City, Harney Peak & S. W. od Springs & Kansea Uitz							St. Francis, P. Que. Chambord Junc., P.Q Quincy, Ill	Maine Sta'e Linc St. Alphon e. P. Que	
leigh Springs				*Memphis, Tenn	Raleigh Springs, Ten	11	Rapid City, S. D	Hamilton, Ill	
inelander & Western							Rhinelander, Wis	. Kansas City West	
							. Providence, R. I Wickford, R. I	Springfield, Mass Nar'ag'nsett Pier, R.1	i.
ode Island Shore Line ritan River. chmond & Danville. chmond, Fred'ksburg & Potomac	Siloam, N. C	Wilkesborough, N.C.	42.3		Bound Brook, N. J				
hmond, Fred'ksburg & Potomac hmond & Petersburg	3	***************************************	7	Main Line	James River, Va	. 3			
chmond & Petersburg. Grande Southern. Grande Western				Dallas, Col	James River, Va. James River, Va. Telluride Fairview, Utah. Low Moor, Va. Martinsville, Va. Morristown, N.J.	45 25	Telluride Fairview	. Marysville, Utah	
noke & Southern		***************************************		C. & O. R. R. Madison, N. C.	Low Moor, Va Martinsville, Va	30	Thistle	Tintic, Utah	
knort, Langdon & Northern	Rocknort Mo	Langdon Mo	7				Kingston Ga.		1
neAlbans & Coal River					Hinchman, Mich		Kingston, Ga Charleston, W. Va Hinchman	Canton, Ga Logan, W. Va Benton Harbor, Mich	
Louis, Kennett & Southers Louis, Kennett & Southers Antonio & Aransas Pass	0				Kennett, Mo	29	Hinchman	Poplar Bluff, Mo	
Antonio & Aransas Pass	******************						Kenedy, Tex	Laredo, Tex	1
de Fuca Ship Canal							Houston, Tex Whidby Isl	. Alexandria, Ga Seattle, W Columbus, O	
ndusky,Columbus,L.Erie & Sout n Pete Valley nta Fe Southern							Chester	. Columbus, O	. 1
nta Fe Southern alte Ste. Marie & Southwestern vannah, Americus & Montgomer shound & Rospoke	Eleva, Wis Helena, Ga.	Mondovi, Wis	10		Montgomery, Ala		Rhinelander, Wis	. Fairchild, Wis	3
board & Roanoke:	. Chester, S. C	Greenwood, S. C.	. 60			1	Athens	. Atlanta, Ga	
hoosed & Rosanoke; fa., Carolina & North attle, L. Shore & West	Near Snohomish, W. Anacortes, W	Inter. line	. 20 . 30	Sterling	Athens, Ga	. 30			
ux Falls Terminal	. Sioux Falls, S. D	end of track	1.5	end of track	S. Sioux Falls, S. D.	. 5	Silverton, Col	Yankton, S. D	
nith Atlantic & Ohio	Solon Me	Ringham Ma	7 25				ithsonia, Ga	. Sandy Cross, Ga]

NEW RAILROAD CONSTRUCTION-JANUARY 1 TO JULY 1, 1890.-Continued.

NAME OF ROAD.	Track laid bet	tween Jan. 1 and July	l.	Under contr	ract or construction.		Under su	rvey or projected.	
NAME OF ROAD.	From.	To.	Miles.	From.	To.	Miles.	From.	To.	Miles
South Bound. Southern & Western Air Line				Savannah, Ga Shelby, N. C Merced, Cal	North	38 96 40	Ku Klux Ferry	Barnwell, S. C	85
South MississippiSpokane Falls & Northern	Colville, Wash	Marcus, Wash	16	Marcus	Little Dalles, Wash	27	Brookhaven, Miss	Monticello, Miss	20
Staunton & W. Augusta	Stuttgart, Ark Bald Hill, Fla.	Toward Dewitt, Ark.	15	End of track	De Witt	10	Springfield, Ill Staunton, Va De Witt	Donnellson, Ill Northwest Pendleton, Ark	59 25 20
Stuttgart & Arkansas River Suwannee River Tacoma, Ellensburg & Conconnully Tacoma, Olympia & Chehalis Valley "Talbotton & Western"	Centralia, Wash	Black River	12	Ellensburg, Wash Black River	East. Gray's Harbor, Wash.	10 49			******
Talbotton & Western	Centralia	Coal mines	3.5	Centralia.	South Bend, Wash .	51	Waverly Hall, Ga Perryville, Tenn	Flint River Nashville. Tenn Dayton, Tenn	30 85
Tenn. River, Dayton & Pikeville		***************************************		Edmundston, N. B.	St. Francis R'v'r,N. B	36		Dayton, Tenn Shreveport, La	6
Temiscouata Texarkana & Shreveport The Dalles, Goldendale & Northern Tiffin & Fremont. Tobione Valley	***************************************	***************************************		***************************************		******	Linn Goldendale, W Marblehead, O Trout Lake, N. B	The Dalles, Or Upper Sandusky Plaster Rock, N. B	25 65
Tobique Valley Toledo & Ohio Central Extension. Toledo, Columbus & Cincinnati.	Amesville, O	End of track	7	End of track	Newton, O	8	Kenton, O No. Topeka, Kan.	Columbus. O	60
Toronto, Hamilton & Buffalo	***************************************				***************************************		Toronto, Ont Hamil'on, Ont Trenton, N. J.	Welland, Ont Brantford, Ont	45 80 25
Troy & New England	Snyders	Pump Sta., Pa	4.5	***************************************	*******		Troy, N. Y	Point Pleasant, N. J., Canaan, N. Y	43
Ulster & Delaware: Detaware & Otsego Ultima Thule, Arkadelphia & Miss. Union Pacific, Denver & Gulf:	***** ***************			*Bloomville, N. Y	Oneonta, N. Y	21	Elebis, Ark	Big Spring, Ark	*****
Union Pacific, Denver & Gulf: Denver, Texas & Ft. Worth	Victor, Col Hodge, Tex	End of track Fort Worth Dundee, Tex	1	Martinsen, Col Road Junction, Col	Red River Mine No. 3 Seymour, Tex	15 3	Along Red River		15
				Dundee	Seymour, Tex	24	White Plains, Ga		40
Umpqua & Coos Bay							Reed Milford, Utah	Marshfield, Ore	75 35 125 65
Utah Central				Salt Lake, Utah	Monahansett Beach	10			25 25 8
66 66		***************************************	****		****************		Sugar House Junc Monahansett Beach.	Weber Canyon Granite, Utah Grantsdale, Utah	20 15
"Vinc'nes,Oakland City & Owensboro Wabash: Peru & Detroit	***************************************		********	***************************************	•••••••••		Vincennes, Ind	Owensboro, Ky	30 70
Walhonding Valley Waukesha, Pew'kee & Oconomowoc Weatherf'd Mineral Wells & N'w'n	***************************************				********************		Wankosha Wis	Chili, Ind Loudonville, O Oconomowoc, Wis,	68
							Weatherford, Tex Arlington Sta , Md Williamsport, Md	Mineral Wells, Tex Colgate Creek Cherry Run, Md Stafford, Md	10 12
Potomac Valley Deer Creek & Susquehanna West Virginia & Pennsylvania West Virginia & Pineville				Pineville, Ky	State line	12	Rowlesburg, W. Va	Uniontown, Pa	35
West Virginia & Pineville West Virginia & Pittsburgh				***************************************			Weston, W. Va Buckhannon, W. Va. Huntington, W. Va.	Braxton, W. Va Gauley R Logan.	30 50 71
West Virginia Central	••••			Portland, O	Steubenville	14	Buckhannon, W. Va. Huntington, W. Va. Shinnston, W. Va. Elkins, W. Va.	Clarksburg	15 14 12
Wheeling & Lake Erie. Wheeling, Wellsburg & State Line. White & Blaca River Valley Whitefield & Jefferson Williamsport & North Branch					***************************************		Portland	Bellaire, O	65 65 15
Wilmington Onslow & F Carolina	Wilmington N C	Scott's Hill, N. C	13	Scott's Hill	Independent N. C.	97	Nordmont, Pa Hall's Station	Williamsport, Pa	17
Woonsocket & Passon				Utica, Minn	Dover, Minn	11	Dover. Woonsocket, R. I Tennille	Osage, Ia Pascoag, R. I Abbeville, Ga	80 10 45
Wrightsville & Tennile. Wyomissing Vanegas, Cedral & Rio Verde Vadkin River				Vanegas, Mex	Catorce, Mex	11	Reading, Pa	Mohrsville, Pa Norwood, N. C Walterboro, S. C	. 5
							Yemassee. Yreka, Cal. Thompson Falls, N.H	Etna Cal	25 35 2

*Work suspended.

ting is not more difficult, but, on the contrary, there is a larger number of stones of uniform dimensions than in the stepped construction. In his own experience he found no difficulty in getting the stone cutting properly done by workmen of a low grade of intelligence. The preliminary preparation by the engineer is, of course. more laborious, but the saving in cost of construction and the theoretical gain in stability are quite enough to warrant the greater outlay at first of engineering work

Mr. Fteley suggested that there is another considera-tion, which, from his point of view, was a very impor-tant one, viz., the reduction in section of the waterway and the obstruction to flow caused by the roughness of

the inner surface of the stepped arch.

Mr. Crowell pointed out that the objections to the stepped arch were, reduced effective diameter, increased area of foundation, difficulty in binding the adjacent ribs so that one would be overloaded while its neighbor was not doing its proper duty, and concluded that the only reason for not using the helicoidal arch is, as suggested in his paper, that the engineer is "overoccupied with the weightier matters of his profession."

Mr. Brendlinger has built many skew arches, but has never used the helicoidal arch. All of his have been made with the stepped ribs. He had built an arch of this class of 20-ft. span on a 46 degree skew and had seen no difficulty with them in any way. He thinks that the contractors would want one to two dollars more per varifor outling steps for helicoidal arches, and that it yard for cutting stone for helicoidal arches, and that it ordinarily almost impracticable for an engineer to give the nece sary time for preparing proper drawings for such arches. When pressed to give the reason why the Pennsylvania Railroad uses the offsetted ribs, Mr. Brendlinger said that President Roberts is a pretty good engineer and could probably explain the rea

This paper was followed by one from Mr. F. W. Wat-kins, On a Method of Taking Cross-Sections in Deep Rock Cuts by Triangulation. Extracts from this pape follow

In the construction of the New York, Ontario & Western Railroad a very heavy cut was required for the approach to the western portal of the Weehawken tunnel. This cut was nearly half a mile long, and increased in depth until at the portal it was 100 ft. deep. The char-

acter and depth of the cut required that it should be excavated in benches or steps. The work was done by the use of two steam shovels, and material removed by trains of narrow gauge railroad dumping cars. Starting in at the upper levels, making a cut or trench, backing down, to make one or more cuts to widen out the excavation, and then going back to start in again at a lower level, and continuing this process until the grade of the roadbed was reached. This of course resulted in a very ragged cut during construction. In the deepest part of the cut the elevations of the top of the sections at the final slope stakes, and of the roadbed at the bottom, were easy to obtain by leveling, but at the "intermediates," on the steep earth and rock slopes, many places could only be reached by ladders, or by lowering a man with a rope, which, it being the winter season, was attended with some danger. Triangulation by horizontal and vertical angles was then resorted to, and the cross-sections were to be taken in each 100 ft. The centre line of the double track roadbed was taken for a base line, and centres and grade pegs carefully marked for each station and section. A transit with a vertical circle and horizontal level tube attached to the telescope was then set on the centre line, from 150 to 200 ft. from the cross-section to be taken, and the elevation of the centre of the telescope above the grade measured. Two men were stationed at the slope stakes for the section to be taken, on each side of the cut, and carried between them a long piece of twine, at the middle of which a small bright plumbob was suspended. This plumbob was drawn across the cut, lowered and raised to touch each point desired for the section, and the horizontal and vertical angles to that point, measured with the transit and recorded in the field book. A simple multiplication of the length of the base line for that section into the natural tangents of the horizontal angles gave the distances out from the centre. The horizontal base line, for the vertic

Mr. Desmond Fitzgerald presented a diagram showing the temperature of water at various depths from zero to 70 ft.

At the opening of the session Thursday afternoon Mr. Clemens Herschel moved that the papers in print be read only by abstract, and that the discussion be limited to five minutes by each speaker. This resolution was

The first paper of this session was on Comparative Tests of an Electric Motor and a Steam Locomotive on the Manhattan (Elevated) Railway, by Mr. Lincoln Moss. The paper is one of much interest and importance and will be given at considerable length in a future There was no discussion of this paper of any importa

Mr. Herbert M. Wilson, of Washington, read by abstract a very interesting and valuable paper on Irrigation in India. He gave briefly an account of the main works built by English engineers in recent years and of the results sought and obtained. Many of those who listened to the paper were astonished at the enormous size of the dams actually constructed. This paper was

somewhat discussed by many members.

The next paper was a very short one, entitled the "Cheapest Railroad in the World," by Mr. Arthur Pew. Mr. Pew described the Dublin & Wrightsville Railroad, now a part of the Wrightsville & Tennille. The distance from Wrightsville to Dublin is 19 miles. The stock subscription for building this road was \$22,600, threefourths of which was considered collectible, giving about \$17,000 to build 19 miles of road. It was assumed that the \$17,000 to build 19 miles of road. It was assumed that the rails and rolling stock could be had of the Central Railroad of Georgia when the roadbed was ready to receive them. Therefore the capital available could be expended on making the roadbed. Grading was begun with 40 convicts, who were paid \$1 per day. The grading cost 9 cents per cubic yard, and the cross-ties 19 cents each. These were cut from trees within 200 ft. of the right of way. Timber for trestles was secured in the same way. The grading amounted to about 4,000 cu. yds. per mile. The cost of engineering for the whole road was about \$1,114; 11½ miles of the road, when ready to receive the rails, cost \$1,164 per mile. The fron was furnished and laid for \$1,800 per mile, being 40-lb. iron from branches of the Central of Georgia. The second annual report of the road showed the 19 miles completed at a cost of \$1,599 per mile.

In the discussion which followed, and which very long, Mr. D. J. Whittemore told of a short piece of very long, which was a supplied by his company. When the In the dis which followed, and which was no road which was purchased by his company. When the negotiations were pending the President of this road, by of emphasizing the extreme economy with which it been built, stated that the engineering for from 30 to 40 miles, the total length of the road, had cost \$500. Mr. Whittemore went carefully over the line and was much puzzled to find where that \$500 had been spent.

session closed by the reading of a paper by Prof. R. H. Thurston on "The Permanent Effects of Strain in Metals and their Self-registration." conclusions were in brief as follows:

If a metal be subjected to a stress of any given kind, or in any stated "sense," sufficient to produce permanent strain and set, then its ultimate resistance to that, or to any other kind of stress, will be sensibly increased, and in all directions, whatever the line of action of the deforming stress.

Mr. George W. Bissell, in charge of the work of instruction in the Sibley College laboratories, has illustrated this principle by striking and suggestive experiments.

Mr. George W. Bissell, in charge of the work of instruction in the Sibley College laboratories, has illustrated this principle by striking and suggestive experiments.

Four series of experiments were planned, in each of which the material employed was subjected to a strain in either tension, compression, torsion, or by transverse loading; and the application of another straining force was then made to reveal the permanent effect of the first, and the altered elastic limit and ultimate resistance. The material used in all of the tests was machinery steel. One piece was tested by tension until a decided set was obtained. A second piece was bent in the neck, straightened and then bent and straightened again in a plane at right angles to that of the first bending. A third piece was twisted forward and back between the centres of a lathe. The fourth piece was compressed until decidedly bulged in the neck. This neck served in all cases to localize the stress. The four specimens were then turned to an accurately uniform diameter, somewhat less than that of the previously strained part, for a length of 10 in. Finally the four pieces were pulled in the testing machine until a decided neck was formed. It was then observed that the previously strained portion was, in each case, of greater diameter by a visible amount than any other part of the specimen, the "neck" having formed near one end; thus showing increased resistance to tension in the strained section and decreased ductility.

Four specimens were then converted into standard torsion test-pieces and were tested to rupture by torsion, diagrams being obtained on same sheet with the first set from the same specimens. The curves showed increased resistance and decreased ductility, and the specimens, when etched to show the disposition of the fibres, displayed on each helices of different pitch; the more oblique being upon the parts strained but once and the less inclined upon the maltreated portion.

Four pieces were strained severely by tensile, compressive, torsional

The discussion of this paper was a more or less humor parring around the modulus of elasticity. Proposition pointed out that the facts noted by Prof. Thurs ous sparring around the ad been well known for a long time, and that their chief significance is that engineers need not be alarmed about using a member which has been strained beyond

Thursday evening President Shinn gave his annual address, which was, according to the by-laws of the Society, a review of engineering progress for the year. The President gave a sketch of the bridges con pleted during the year, and of those under construction. He cited two serious railroad accidents which resulted in great loss of life and of money, which demonstrated the importance of good bridge floors, and he spoke of the growing use of buckle plates or other forms of solid floors. He gave certain statistics of railroad mileage and equipment and pointed out the very small average service of the freight equipment of the country. This led up to some com

ment on the progress made toward a system of demur-rage charges which he had long advocated.

Great progress has been made during the year in safety appliances. The President spoke of the amount of passenger equipment of the country now heated by steam from the locomotive, and stated that his experi-ence on the New York & New England had shown that there is actual economy in this method of heating Great progress has also been made, he considers, toward safety in lighting cars. The progress in the use of power brakes and automatic couplers was also mentioned. The use of block signals, and especially of automatic block ignals, was briefly commented on.

Mr. Shinn dwelt at some length on the importance of making schedule time. He holds that it is more important to have trains on time than to have them fast, and states that there is less promptness and accuracy in passenger train service now than there was 20 years ago.

Mention was made of the proposed railroad uniting ne systems of the United States and South America, which Mr. Shinn thinks will be built before many years Allusion was also made to the Chignetto Ship Railway and the Nicaragua Canal. After brief mention of progress made in electrical engineering Mr. Shinn spoke of the great water power project at Niagara Falls, of the drainage of the valley of the City of Mexico, of the awakening interest of public men in the matter of com.

mon roads, of the failures of dams during the year and of the proposed channel bridge.

He spoke briefly of some neglected matters in the

education of an engineer, who he said should structed in accounts, and in the fundamental theorie of the law. He spoke also of some of the disadvantages and embarrassments of the ordinary system of expert evidence and held that expert witnesses should be elected by the Court and not by contestants. Following the President's address was a

esting account by Mr. R. B. Stanton of his journey through the cañon of the Colorado. Mr. Stanton's talk was illustrated by photographic views thrown on a screen by a stereopticon. He took about 900 of these views, of which something more than 100 were shown on

Friday morning was devoted to an excursion to Johnstown. Some of the party visited the town and looked over the scene of the flood, while others went through the iron works.

Friday afternoon the first paper read was by Mr. C. B. Brush, entitled "One Way of Obtaining Brine." It described briefly the work done in procuring salt from the deeplying rock salt in the vicinity of Syracuse. About 20 miles from Syracuse are found beds of rock salt, commencing about 1,200 ft. below the surface. These beds are 43 ft. and 54 ft. thick. Into these beds wells have been sunk which were double tubed. Fresh water is forced down through one tube and after it is saturated with salt it is forced any through the other tube. The with salt it is forced up through the other tube. The roject involved bringing fresh water from the Tully akes, a distance of 3 miles, by 12-in. cast-iron pipe. When the water is saturated it is carried by pipe through two great open surface reservoirs, one of 1,000,000 galls. capacity at the wells, and another of 3,000,000 The pipe line connecting these re galls. at Syracuse. rvoirs is also of 12-in, cast-iron pipe.

The next paper was by Prof. Henry Eddy, on "A new Graphical Solution of the Problem, what position a Train of Concentrated Loads must have in order to cause the Greatest Strains in any given part of a Bridge Truss o Girder." This paper, being a long course of close math ematical reasoning, was read only by abstract.

It was followed by a paper by Prof. William H. Burr, on "The Three River Spans of the Bridge recently completed across the Ohio at Cincinnati," which Mr. Burr spoke of as the greatest simple continuous span yet nstructed. Handsome lithographs of the structure ompany this paper.

This was followed by a paper by Mr. J. Leland Fitz. Gerald, "A Comparison of Water Supply Systems from a Financial Point of View.

Friday evening was devoted to the customary "ban-quet." We regret to say that this was a dismal failure, largely from the effort of the dinner committee to do something novel. The toasts were interspersed between the courses thus: clams, speech; soup, speech; and so or to the end. The dinner was announced for 20 o'clock, but the guests did not take their seats until 21:15, and the first half hour was occupied with six clams and a speech, so that it was 21:45 before the soup came on. Some of the guests, of a mathematical turn, computed that, at the rate at which the early part of the alleged banquet went on, it would occupy about 9 hours, and naturally many of them left after the first three or four courses.

Saturday morning an excursion was made to Bell's Gap by the Bell's Gap Railroad. In the afternoon the business meeting of the Society was held, the President being in the chair. Several standing committees re ported progress and were continued. A communication from the Western Society of Engineers was presented, containing a copy of a report of a committee of that society on an international engineering congress. Ex tracts from this report follow:

society on an international engineering congress. Extracts from this report follow:

It is eminently fitting that engineers, representing the various branches of engineering, should be called together from all parts of the civilized world on the occasion of the celebration of the 400th anniversary of the discovery of this continent. Engineering societies in other countries should be asked to send delegates to the Congress, and governments themselves should also be requested to send representatives: We recommend:

1st. That this Society initiate the preliminaries for the Congress by requesting each of the national societies—the American Society of Civil Engineers, the American Institute of Mining Engineers, the American Institute of Mining Engineers, the American Institute of Mining Engineers, the American Institute of Civil Engineers—to appoint a committee of not more than five members (two at least of whom shall be residents of Chicago or vicinity), to meet in this city on Oct. 1 of this year with a committee of seven of this Society, for the purpose of formulating the plans for the Congress.

2d. That all local engineering societies of the United States and Canada, of recognized standing, be requested to send to this meeting committees of not more than three delegates, and that the committee of this Society be authorized to appoint as delegates to this meeting one or more engineers from those sections of the country that have no engineering organizations.

3d. That the committee of this Society be instructed to confer at once with the proper committee of the exposition, with the view of arranging for the Congress to be held under the auspices of the exposition, and under its general management.

4th. That the correspondence be conducted in the name of this Society during all of the proceedings, and who shall also act as secretary for the committee to be appointed as herein provided.

E. L. CORTHELL,
O. CHANUTE,
D. J. WHITTEMORE,
BENEZETTE WILLIAMS,
CHAS, FITZSIMONS,

Committee.

The Society was asked by the Western Society to appoint a committee to meet in Chicago in October and lay out a plan for the proposed Congress. It was sug-gested that the date of this meeting should be changed to the time when many members of the American Society and of other societies will be in Chicago on the occasion of the visit of the British Iron and Steel Insti-tute, and the Verein Deutscher Eisenhüttenleute, and Mr. Chanute and Mr. Whittemore, of the Western Society committee, said that such a change of date would doubt-ess be made. It was voted that the President appoint less be made. It was voted that the President appoint a committee of the American Society of Civil Engineers to meet other committees as requested, and that the President be chairman of that committee. No other business was brought before the business meeting, and the sessions of the convention were resumed.

A nominating committee was elected in the customary way, resulting as follows: Mr. Charles Paine, Chairman: General W. B. Franklin, Mr. M. L. Holman, Mr. D. Bouscaren and Mr. A. M. Wellington. This session closed with a paper by J. Elfreth Watkins on the Begin nings of Engineering, with special reference to early Engineering Science in America, and one by Mr. C. P. Bas-sett on Inland Sewage Disposal. In the evening the members of the Society and their

guests went by special train to Altoona to attend a re ception given in their honor by Mr. and Mrs. T. N. Ely. Sunday was spent at the Mountain House.

At the Monday morning session the secretary read an abstract of a paper on the "Littoral Movements of the New Jersey Coast," with remarks on beach protection and jetty reaction by Prof. L. M. Haupt, illustrated by and photographs. He discussed the subject at

Prof. O. H. Landreth presented a paper on "The Electric Street Railway System of Nashville, Tenn.," in which he noted its remarkably rapid development and extension resulting from the change from mules to electricity. There are now 64 miles aggregate length of track and There are now 64 miles aggregate length of track and over 100 cars. The overhead single trolley system is employed. The power developed is 670 nominal electrical H. P., at 500 volts pressure. He described the plant, its details and operation, estimating by three different methods the total amount of power developed, and gave data of the effective power, cost of production, etc. The operating expenses are very little increased, and the receipts are nearly doubled, both by expansion of the line and increased speed, which induces people to ride for pleasure. The maximum grade is 8 per cent. There are several 6 and 5 per cent. grades.

The secretary read a paper by N. W. Eayrs on "The Ventilation of Tunnels." The author discussed two methods of removing smoke and gases from tunnels, by natural and by mechanical means. The first operates by producing circulation by temperature and barometric differences, and does not influence short tunnels with their ends at the same levels, but where the engine acts potably as a piston. The Hoosac Tunnel is the most important example in this country of natural ventilation. It has a shaft over 1,000 ft. deep with connecting galleries at the centre, and in winter has closed doors at the ends, and near them warming furnaces to prevent freezing of the atmospheric moisture. The St. Louis Tunnel has a ventilation stack 130 ft. high, and a fan house and fan near its centre. Artificial ventilation is most developed in England. In the Mersey Tunnel fresh air is admitted at stations from an auxiliary parallel air tunnel, and the circulation is here, as in several other English tunnels, maintained by fans of from 30 to 40 ft. di-ameter. The conclusion was that successful ventilation lies chiefly in keeping smoke and gas out of the tunnel, instead of admitting and then removing it.

The secretary read a paper on "The Turn-Table on the fain Track of the Silverton Railroad in Colorado," by C. A. Gibbs. The author described this railroad as the steepest, crookedest and best paying one in Colorado. It traverses a very rough country, and had to run over a switchback, for whose operation this turn-table in the main track is used for the engine. The train runs by gravity both ways to the turn-table. Several other papers were read by title.

Mr. A. N. Snyder, of the Pennsylvania Railroad, gave, by request, a very interesting account of the history and construction of the South Fork Dam, illustrating it with maps, profiles and blackboard diagrams. A discussion followed on the failure of the dam and the destruction of bridge No. 6 in the Conemaugh Valley, about two miles below the dam, which W. H. Brown, Chief Engineer of the Pennsylvania Railroad Co., failure of one tributed to undermining and t foundations wh the abutment foundations which, in compliance with state specifications, had been built on a timber platform which the rebuilding of the structure showed to have been only 4 ft. above bed rock. Other opin-ions were advanced to the effect that the failure was due to the impact of the flood wave, to the ramlike effect of to the impact of the flood wave, to the ramike effect of floating debris, etc., and the general theories of flood wave form and motion and the causes and manner of failure of the South Fork Dam, with descriptions of its former and present appearance, were given.

Secretary Bogart described a recent break in the Champlain Canal and the method of repairing it. At the time of the break there were about a wide shelf beats.

of the break there were about a mile and a half of boats. bound eastward, detained, and most of these were loaded with ice for New York. A double culvert passed under the canal at the place where the break occurred and water had undermined the foundations of the culvert. A sort of aqueduct was constructed of wood found in the neighborhood, by which the canal was carried directly over the injured culvert, which can be repaired at leisure. The passage of boats was immediately resumed. The concrete used in connecting this aqueduct with the canal walls was made with coal taken from a boat injured at the time of the break.

In the afternoon the members went to Altoona to

he shops.

It seems to be the general opinion that the convention was one of the pleasantest and most successful ever held. The attendance was large, the accommodations good and the weather delightful. The place, being very quiet, offered unusual opportunities for social intercours among the members.

Erie Docks at Weehawken.

The New York, Lake Erie & Western Railroad, through a separately organized "Dock and Improvement through a separately organized "Dock and Improvement Company," is now enlarging the terminal grounds of that road at Weehawken, opposite New York City, under a plan which involves the expenditure of about \$1,500,000. Over one-third of this amount represents work now under contract or completed, and the improvements will be prosecuted continuously during the present year and into 1891. We print herewith a diagram of the grounds, showing the wharves and tracks. This property is reached from the Erie main line over the New Jersey Junction Railroad, the distance from the New Jersey Junction Railroad, the distance from the Eric station being two miles. The Eric may con-struct an independent road between these points at some future time.

The letters on the drawing indicate as follows: R and S, New Jersey Junction Railroad main tracks; T, Eric independent track. The tracks east of the latter are Eric sidings. A portion of these, as well as some of the curved tracks leading to the dock, are already constructed. The curved tracks now standing between X and Y are upport tracks. and Y are upon trestles. The ground divided into sections, with a building marked P in the centre, is occupied by the stock yards. Piers J and H have been in use for several years, this terminal having been used largely for handling oil of the Standard Oil Co. K is a cooper shop and L a storehouse. N is an overhead bridge for driving eattle to the piers. M is the property of the

driving eathle to the piers. M is the property of the Delaware & Hudson Canal Co.

Piers A and B are already completed and in use.

Piers C and D are now under contract to be built by Messrs. T. & A. Walsh. Pier C is to have a warehouse, which will be built by Cofrode & Evans, and Pier D is to have one built by R. B. & J. H. Staats. Piers G and I are to be built by Grattan & Jennings, of Buffalo. The total cost of the work now in progress and under contract will be about \$560,000.

A portion of the ground between the main tracks of the New Jersey Junction road and the bulkhead line is

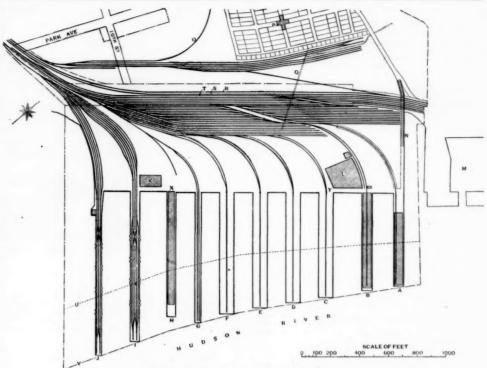
the New Jersey Junction road and the bulkhead line is now occupied by old buildings and sheds, which are to be torn down, but the space between X and Y and extending back nearly to the main tracks is not yet filled up to grade. The work of filling this and of constructing the bulkhead is now in progress, Messrs. Ross & Sanford being the confractors

Sanford being the confractors. The total area of the property of this company at this point is 94 acres, and the docks, when completed, will afford about 11,000 linear feet of frontage for vessels to tie to. The stock yards cover 20 acres. As will be seen by the scale the bulkhead line will be about 1,200 ft. long. Piers C, D, E and F are 100 ft. wide; the others are narrower. Pier G, 40×900 ft., will be provided with cranes and derricks for handling heavy freight. Pier A has a one-story warehouse, and Pier B one of two stories. Piers C and D are to have warehouses, as above stated. above stated.

Steel Air Brake Fittings.

The Westinghouse Air Brake Co. has used for over two years steel fittings for air brake piping to the ex-clusion of galvanized malleable fittings and has found them very satisfactory. A letter from the company states that galvanized fittings of the best manufacture have given considerable annoyance, while the steel fit-tings are found to be air tight; the threads full and sharp and accurately tapped, making these fittings the best in all respects for air-brake service. As is known, the company has recently adopted the policy of not selling pipes and fittings, but it recommends to its customers, as we understand, the steel fittings. The diffi-culty of maintaining perfectly air-tight joints in train piping is very great and the ordinary run of malleable fittings are not only imperfect in gauge, but often so imperfect in finish as to permit serious leakage. The difference in the price of steel fittings and those of malleable fron galvanized is nominally not great, while probably it is often more than made up by the number of malleable fittings found defective and rejected. Steel fittings are now used by many railroads, and also by contracting car now used by many railroads, and also by contracting carbuilders. Various roads are also using them for locomotive work, in sizes of from ½ to 2 in., having found them economical in connecting up and also in maintenance. The steel fittings made by Messrs. Stanley G. Flagg & Co., of Philadelphia, have been particularly recommended by the Westinghouse Company.

A diagram which appears herewith shows the dimensions of the Keystone soft metal union made by the same company, which, it is claimed, is a decided im-



YARDS AND DOCKS AT WEEHAWKEN, N. J.

provement over the ordinary washer-packed union for occomotive work and not so susceptible to variations of temperature. In the head piece is a soft metal packing temperature. In the head piece is a soft metal packing, concave, the tail or opposite piece being convex, with finished surfaces, which allow the pieces to be screwed up tight and loosened again without injury to the seat. In case the pipes are a little out of line the convexity of the seat ensures a tight joint. This union is made to stand high pressures. No other packing than the soft metal is required. The best results are obtained by attaching the convex finished piece to the pressure end of the pipe. of the pipe.

Car Accountants' Convention.

The fifteenth annual convention of the Internationa sociation of Car Accountants was held in New York City on June 24, 25 and 26. There were 93 members present representing various railroads, and also quite a large number of associate members representing fast freight number of associate members representing fast freight lines and private car companies. Many of the delegates were accompanied by their wives, swelling the total number to over 150 persons, which is considered a very good representation. The election of officers for the ensuing year resulted as follows: President, E. M. Horton, Illinois Central; Vice-President, C. H. Ewings, New York Central; Treasurer, M. C. Trout, Toledo & Ohio Central; Secretary, S. P. Sechrist, Editor Official Railway Equipment Guide. Executive Committee: A. Hale, Pennsylvania; C. J. Fellows, C., C. & L.; C. P. Chesebro, Wabash. The first order of business was the receiving of reports from the various committees. The reports receiving special attention, and which were the subject of considerable discussion, were those of the Committees on Per Diem Car Service, Cipher Code, and Demurrage. Then followed the reading of papers and discussion of Then followed the reading of papers and discussion of their contents. Among the more important papers were the following: Errors in Reports and Method of their Correction, by A. Hale, Pennsylvania; Straight Per Diem: Its Advantages over Mixed, by M. C. Trout, Toledo & Ohio

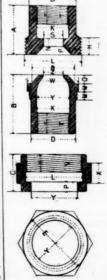
Central; Detention of Foreign Cars on Roads, and What Should Be Done to Prevent It, by A. D. Penfold, Merchants' Dispatch Transportation Co.; Cause of the Constantly Decreasing Mileage of Freight Cars, by W. G. Wattson, West Shore; The Economic Working of Car Record Departments, by Edmund Yardley, Pennsylvania Co. The next meeting of the Association will be held at Denver, Colo., during the third week of June, 1891.

The members of the association and their families were well entertained on the occasion of their visit to the metropolis. An elegantly appointed special train, tendered by the Lehigh Valley, brought about ninety-five of the party from Buffalo to New York on Monday. The train made very quick time, lunch being served on the train. On Thursday a trip to West Point and return was made, going by the Albany Day Line steamer "New York" and returning by the West Shore Railroad. On Friday an excursion to the seashore was provided, jointly by the Central Railroad of New Jersey, and the Pennsylvania, going by steamer from New York to The members of the association and their families were Pennsylvania, going by steamer from New York to Sandy Hook, thence by special train to Long Branch, Ocean Grove and Asbary Park and thence to New York. We give below the main portion of Mr. Yardley's

ECONOMICAL WORK IN THE CAR RECORD OFFICE.

The form of the record books should be such as to enable the clerks to make the greatest number of entries in a given time with a minimum amount of labor. Hence, the page should be small so that it can be turned with facility. Every inch that is added to the size of the page beyond a proper minimum interferes with its being turned rapidly, and I should say, though with less positiveness of statement, increases the liability of the leaves being torn.

The size of the page I use is equal to a sheet of flat cap, and is the outcome of years of experience and experiment. The latest variation we tried was to turn this form sidewise, making the page longer than high, but after a year's use it was abandoned for the present size, which is very near that used previously. Every leaf, or at least every other leaf, should be indexed. If the leaves are not indexed less work of equal quality is accomplished per man; which, of course means an in-ECONOMICAL WORK IN THE CAR RECORD OFFICE.



MALLEABLE

	1/8	1/4	3/8	1/2	3/4	1	11/4	11/2	2		1/8	1/4	3/8	1/2	3/4	1	14	11/2	2	
A	25/52	13/16	31/32	1%	1%	11/2	19/1	1%	19/16	0	3/16	1/16	16	1/50	1/32	1/10	1/4	2/2	1/16	ŀ
В	31/32	37/32	19/30	11/2	11%	196	11/32	1460	21/0	P	9/44	%	%	1/2	1/50	%	1/50	%	%	ľ
C	186	1/8	23/12	03/00	15/16	11%	11/1	13/16	136	R	%	%	1/16	11/32	%	%	4/10	13/4	15%	Ì
D	19/12	23/2	57/44	11/60	1%	18	115/16	24%	25%	S	1/32	1/32	19/30	1/6	29/30	11%	13/10	15%	2%	ľ
E	11/16	11/16	13%	19/1	14%	23/16	25%	24	33%	T	27	18	18	14	14	10%	111/2	111/3	11%	Ì
F	5/16	4,6	3/6	1/8	13/32	5/6	5/4	5/4	5.5	٧	18	18	14	14	111/2	11%	111%	8	8	Ì
Н	1/12	%=	5/10	1/32	13/2	1/16	%	3/16	21/52	w	27/50	2/32	1	14/4	1%	19%	21/50	29%	31/4	Ì
K	1/10	%	1/10	55/4	11/16	11/2	PK	17/2	29%	X	3/4	%	1/16	1/10	1/2	3/62	1/0	11/10	19/10	İ
L	13/16	15/16	15/38	11%	136	150	21/16	my	35%	Y	3/4	26	%	11/16	13%	1%	21/10	25%	28%	İ
M	1/6	1/8	9/30	9/64	5/30	3/16	1/32	3/10	3/6	Z	1/32	11/50	13/50	3/4	%	11/32	13%	19/10	2	İ
N	1%	16	1/52	5/10	3/6	3/4	36	15/2	2/16	8	3/30	2%	1/4	1	13/10	1%	19/	246	2%	İ

HEXAGON

DIMENSIONS OF KEYSTONE SOFT METAL UNIONS.

creased pay-roll. One of my friends from whom in other respects I have derived valuable ideas uses a bottom index, cut in the opposite direction to that on the side for the sake of turning back to a car as well as forward. I can only say that after a year or eighteen months' trial this modification was abandoned as not being worth the additional complication. We were more successful in adopting a suggestion of one of the clerks and running the index by pairs of leaves instead of indexing every one. The advantage being, of course, that the index space per leaf was double the previous size, a matter of considerable moment when the books are thick. It was our experience that with this arrangement the page wanted could be turned to almost, if n-t quite as quickly as when every leaf was cut separately, and it proved especially advantageous on the Home Record, which we ran 50 cars to the leaf, the index, as thus cut, covering 100 cars.

wanted could be turned to almost, if n-t quite as quickly as when every leaf was cut separately, and it proved especially advantageous on the Home Record, which we ran 50 cars to the leaf, the index, as thus cut, covering 100 cars.

I use linen paper weighing 26 lbs. to the ream. My books are bound in full slate-colored canvas duck which I find both serviceable and cheap. The thickness of the books is determined by the length of time they are to rum, and by the number of cars in the equipment and on the road; it is modified, as will presently appear, by the size and organization of the office. As used by me they were calculated to run one month, each containing from 80 to 100 leaves.

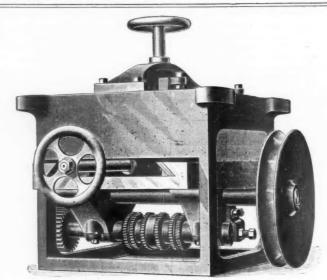
The organization of the office must vary with the size of the road, and in a lesser degree with the kind of information which it is expected to furnish. Let us take the case of an office keeping the record for a system of roads about 1,000 miles long, and having an average of 15,000 freight cars constantly on the line. In such an office the entries made in the ordinary manner would amount to 450,000 per month, costing at a liberal estimate for a well-kept record, say \$700—I speak of the actual recording only. The number of entries per day would manifestly be \(\frac{1}{35} \) of 450,000; that is 17,000. To do this work in the ordinary way, by giving each clerk a certain assigned number of cars to keep would require 17 clerks, each of whom must put in 1,000 entries per day, and whose salaries we may average at say \$35 per month. The estimate is a close one, as it is hard for a clerk to put 1,000 entries per day under the conditions named, but as it can be done on the plan described in the Raitroad Gazette of Nov. 29, 1889, I will let it stand. This uses up about \$600, the remainder of the money being expended on supervision, bringing forward the books, looking up missed cars on the reports, etc. Seventeen record books will thus be required of about 100 pages each. Now since each clerk must examine all the reports coming into the o

m which the number of reports to be looked over would be so great that the clerk would be unable to enter any cars at all. It is to be feared that the lost motion in some of our larger offices is already a serious item of expense.

Here then would seem to be one branch of the railroad is service in which the prevailing tendency to concentration meets with a check, large car record offices not being worked as economically as those of a more moderate size. How is this difficulty to be met and overcome? A night force can be put on, and two or even three shifts of eight hours each can be made, each book being worked by three different clerks. This economizes office room, but as the office increases the same old difficulty will reappear. The system in which each clerk takes out a few reports and enters upon the books, does not meet this difficulty. While that system seems nearly perfect in meeting, the object for which it was designed, and while under it the lost motion is reduced to a minimum, and there are no missed records, every car on the conductors' reports being entered on the books; while it makes every clerk equally familiar with all the books and further enables us, if we so desire, to pay the clerks by the piece, yet it fails to meet this difficulty, though it puts it further off. The reason is simple: As the number of books increases with the size of the office, the time that can be allotted to each grows shorter, and we are driven, as before, to longer hours and night work. To illustrate: With an office working 17 record books, and a day of eight hours, the average time that each clerk can keep a book is from 20 to 30 minutes. With an office of twice that size he could manifestly have not more than 10 to 15 minutes.

The menedy is simply to keep an independent record office (which was described in the Railroad Gazette of Nov. 29 last) Mr. Yardley said in part:

The more definite a clerk's work is made, and the more exact the ratio his compensation bears to the work accomplishing the same work, for I sho



DAVIS' VALVE PORT MILLING MACHINE.

Davis' Patent Valve Port Milling Machine.

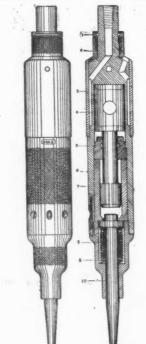
This machine is designed for milling out ports in the valve faces of cylinders, and it is a valuable tool for the purpose, as it will duplicate work exactly and quickly. It consists of a frame that is of itself a template resting on the seat that the studs are placed in and supporting the steam chest. This frame carries another frame, which has two distinct movements, carrying milling which has two distinct movements, carrying milling cutters that are arranged on a mandrel with space washers, so that the bridges and ports can be all cut to dimensions at one operation. The inner frame is fed down into the cut by the hand wheel and screw shown on top, and is fed the length of ports by the hand wheel at the end of the machine. It is operated by a rope belt similar to that need for driving drille, etc.

imilar to that used for driving drills, etc.

This machine is much lighter than the cylinder, and can be readily placed in position, using the stud holes to attach to, for that purpo e. It is built by Messrs. Pedrick & Ayer, Philadelphia, Pa.

Pneumatic Caulking Tool.

The Rhode Island Locomotive Works have just put into use in their boiler shops a new caulking tool for caulking locomotive boilers. The illustrations herewith show the device in section and exterior view. The tool is used for wood carving, engraving, and for mining and other purposes, but in the form here shown it is adapted to boiler work. With this tool a large number of small



blows are struck per minute, while the tool is held against the work with a light pressure. It consists of a cylindrical case in which works a piston that reciprocates to and fro. At one end of the stroke it strikes the caulking tool, at the other it is cushioned by the compressed air which drives it. The pressure required varies from 10 to 50 lbs. per square inch.

At the Harrisburg Car Works, Harrisburg, Pa., the device has been working satisfactorily some time. The

man made so much money at it that it was taken out of his hands. It did not seem becoming that an employed should be making so much beyond his salary. He was able to do the work well and cheaply by hiring only the very best men he could find and paying them 50 cents a day more than the usual rate of wages.

Rhode Island Locomotive Works say: "Its operation is entirely satisfactory, and it does the work of three or four men." The simplicity of the device renders a description unnecessary. The numbers on the drawings refer to the following list of parts, which clearly indicates the tion unnecessary. The numbers on the drawings refer to the following list of parts, which clearly indicates the purpose of the different details.

Throttle nut. Throttle. Jacket. Piston. Split washer.

6. Cylinder.
7. Washer sleeve.
8 Compound spring. 8. Compour 9. Nose. 10. Spindle.

This tool is made by the American Pneumatic Tool Co., 431 Eleventh avenue, New York City.

Solid Bridge Floors.

Referring to the article in the Railroad Gazette of last week describing the solid bridge floor made by the Pen coyd Works, Mr. G. H. Thomson, bridge engineer of the New York Central & Hudson River, reminds us that he used solid floors in 1874. In that year a short span bridge was built on the line of the New York Central with a floor made of old rails. These rails were covered with ballast, on which the ties were placed. This form of bridge floor had been very largely used by that company, and many short span bridges so constructed are now in service. The use of trough shaped floors by the now in service. The use of trough shaped floors by the New York Central is constantly increasing. Two bridges, 4 tracks each, 66 ft. span, are now building in New York City. with floors of the form illustrated by us some time ago. That is, the troughs are of rectangular section built up of plates and angles. These bridges are building by the Hilton Bridge & Construction Co., Albany, N. Y. The New Jersey Steel & Iron Co. is building for the New York Central at West Lockport a double track bridge, 45-ft. span, with floor of the same type. The railroad company is building 24 double track short span structures, about 10-ft. span, with the solid floors, and about 50 with the rail floors. Bids are now out for 12 short-span bridges with the trough floor out for 12 short-span bridges with the trough floor placed longitudinally, and for one three-track bridge to have the Pencoyd floor. The latter is a deck plate-girder bridge of 45-ft. span.

The Colorado Canyon Railroad.

At the Cresson Convention of the American Society of Civil Engineers Mr. R. B. Stanton was the lion of the occasion. His talks of his recent achievements in exploring the canyon of the Colorado were listened to by audiences who never tired. On the first evening of the convention he gave a very fine exhibition, by the aid of a stereopticon, of photographs taken on this expedition, which served as a thread on which to hang a short and modest story of an exceedingly adventurous and perilous journey. Whatever may be the fate of the projected railroad, Mr. Stanton's exploration of the canyon will remain as a part of the history of our country.

It may be well to recapitulate some of the facts con-It may be well to recapitulate some of the facts con-cerning this proposed railroad, which have been from time to time published in these columns. The proposed railroad is from Grand Junction, Colo., down the Colorado River to the head of the Gulf of California, with a line from Fort Yuma across to San Diego. The total length of the road as projected is about 1,200 miles. Of this distance 600 miles is through the canyons. As is well known, the only white men who ever followed these canyons through their length are Major Powell and Mr. Stanton, and the few who accompanied them cessary to recall here the great difficulty and peril of the journey and the magnitude and beauties of the canyons. It is sufficient to say that Mr. Stanton came back thoroughly satisfied that a railroad through the canyons is not only practicable, but can be built at a comparatively reasonable cost. The 600 miles of can. you work would involve a great deal of rock work, but there are many stretches where the line can be carried on benches, involving but little excavation, and on flats where the canyons open out, leaving narrow strips of bottom land.

The first great object in building this road would be to

place coal on the Pacific coast. It is estimated that coal could be delivered there, from an inexhaustible sup ply, at about half the cost at which it is now imported.

This would be the most important element in the This would be the most important element in through traffic. Of course it is anticipated that a very valuable tourist business would be created. It is difficult to conceive how any important local business could be developed in the 600 miles of canyon country. Mr. Stanton says that in this region will be developed some of the most important mining properties in the world. Rich placer mines may be opened there and a considerable variety of good minerals is found in paying quantities. After leaving the canyon country much of the lower country may be developed into a good agricultural region by irrigation.

No estimate of the cost per mile of constructing this road has yet been made with sufficient accuracy to war-rant its publication. A company to build it is chartered in Colorado, under the name of the Denver, Colorado Canyon & Pacific Railroad, and it is probable that within a few months steps will be taken to secure the capital to build the road.

Train Dispatching: Its Uses and Abuses.

A paper read before the ninth annual meeting of the Asso-ation of Railway Telegraph Superintendents, Niagara Falls, Y., June 19, 1890. By G. C. Kinsman, Superintendent of elegraph of the Wabash Railroad.

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In this country we run to extremes. Moving trains by telegraph has been discussed from the Atlantic to the Pacific, without cessation, until many of our best men are growing to believe that there is no other way to get trains over the road promptly, and are placing their sole dependence upon it to the utter neglect of more important methods. While no important single track railroad could move a large traffic successfully without train dispatchers, the dispatcher's work is greatly overdone, and the tendency is to still further increase it. On many roads, freight trains are started from terminals at any and all hours, with little regard for the time table, and the train dispatcher is expected to get them over the road promptly and safely. Regular trains are held at terminal and way stations for all sorts of trivial reasons, necessitating many train orders, and other delays, and the officials fume because of late trains, blockades and accidents. To get profitable train movement two things are necessary: first, make a time table that trains can run by, then run the trains by it. Many will argue that this can be done only where the volume of traffic is moderate and regular, and where there is an abundance of power. These are the officials, who, when a rush of business overtakes them, fill their yards and passing tracks with surplus loads, start trains from all points whenever they can be got ready, without any regard for the time tables; keep their crews on the road 20 hours out of 24, and abuse the dispatchers because the trains are laid out. It is not in the power of any dispatcher to succeed under these circumstances. They may work and worry, and incur risks which make them gray, but at the end of the month, it will be found, that although every nerve has been strained, the average time made by trains has b

petent and reliable men; the opposite will drive them away.

During the month of January, 1885, under our former system of train orders, and which, I may add, was in all essential respects similar to the uniform system now in use, our freight-train mileage was 611,928, passenger train 311,330, total 923,327 train miles; the number of train orders issued by the dispatchers was 55,720, average speed of freight trains nine miles per hour; of passenger trains 25 miles. During January, 1890, the freight-train mileage was 600,421, passenger train 382,103, total 1,078,527 train miles; the number of train orders issued by the dispatchers i7,2 5; average speed of freight trains 13 miles per hour; of passenger trains 29 miles. In the former case 40 per cent. of the regular trains were late; in the latter, less than 10 per cent. This statement covers 1,921 miles of road, the same lines in each case. It is but proper for me to state, however, that this improvement is not all due to the fact that we are running our trains by the time table. The physical condition of the property is much better than in 1885; there was no surplus power then, nor is there now. Nor has there been in the aggregate any considerable increase in the side track or terminal facilities. It is particularly noticeable, however, that system and regularity in everything, has developed a painstaking care on the part of the train men, which makes accidents rare.

In the matter of educating our dispatchers we are

on the part of the train men, which makes accidents rare.

In the matter of educating our dispatchers we are sadly deficient. We put a bright operator into a dispatcher's office for a short time as assistant and then place him in charge of a division. The chances are that he knows nothing about the operation of an engine, and of the track, the grades, curves, sidings, water tanks, etc., he has practically no knowledge at all. Neither has he of the numerous duties of freight conductors and brakemen. It is not surprising that under such circumstances trainmen have not the greatest respect for dispatchera. Before going to work as dispatcher, a man should run over the division at least a month as brakeman on a freight train. Instead of having three dispatchers for a given section of road, I would have four, and every fourth week one of them should run a freight train upon his division. They would thus be at all times familiar with everything on the road, and the change would give them back the health and energy which constant confinement has taken away. Such an arrangement need not increase the expense, but it would add to the revenue.

A few words concerning the uniform system of train

add to the revenue.

A few words concerning the uniform system of train orders adopted by the Time Convention. Every road, so far as I can learn, which has faithfully lived up to it, atisfied, and would not go back to the former system.

Fig. 3 C Fig. 2. Fig. 4.

Upon other roads (let us hope the number is small) this system has been adopted, but not enforced. These doubtless regret that they made the change. Some officials have adopted this system, and folded their hands, expecting great results. They might with equal confidence expect a sewing machine of itself to make a pair of pants. It is claimed that the system is slow and cumbersome. Dispatchers are, as a rule, anxious to avoid even the slightest delay, and their zeal is apt to outrun their foresight, inducing them to give too many orders. It is a good thing if the system is cumbersome enough to prevent this, and if the official who is using the old system (or neglecting the new) would disguise himself and see how his orders are being handled on the road, he would wish for tape of a still brighter hue. The standard code may be slow, but with it, we have moved more than 1,000 cars per day (in addition to 30 regular passenger trains) over a crooked single track road, every day in the month, without any serious delays or complaints from the dispatchers. There are some peculiarities in the wording of the various forms which make it difficult for the dispatcher to remember, and for which, there is no apparent necessity, for instance:

Form B., Example 2:

"No. 4 will run ahead of No. 6 from Bengal to Madras."

ras."

Form C., Example 1:

No. 1 has right of track against No. 2 Mecca to Mir

"No. 1 has right of track against No. 2 Mecca to Mirbat."

The word "from" appears in one order and is left out of the next; the same thing occurs in Forms E and F; this is very confusing to the dispatchers and we had a great deal of annoyance for a while on account of the word "from" being left out where it should appear, and put in where it should have been left out. With this exception, we have no occasion for finding fault with the system.

DISCUSSION.

put in where it should have been left out. With this exception, we have no occasion for finding fault with the system.

DISCUSSION.

Mr. DARLTON (Richmond & Danville) inquired how such a system could be introduced where the side tracks were of limited capacity, and the freight trains were run in six or seven sections.

Mr. KINSMAN replied that they had exactly such a situation. At one time they ran as high as 18 sections. Then the 'trains were divided into two sections and scheduled two hours apart, according to the side track capacity. They had succeeded in reducing the number of train orders as stated in the paper, and hoped next year to reduce them to 5,00c.

Mr. M. Magiff (Central Vermont) inquired about moving special trains, saying that it was not always possible to get trains on schedule time.

Mr. KINSMAN replied that if everybody would live up to a system it would be possible. Three-quarters of the trains did not start on time because the yardmen did not have them ready.

Mr. Magiff stated that his road had almost abandoned the use of flags and made everything special. Mr. HAMMOND (Missouri Pacific) remarked that it had been suggested on some important roads that the time cards be abandoned in the case of freights. In reply to a question from the same gentleman if they had had any trouble from running a light engine behind a passenger train, Mr. Kinsman said the practice had been abandoned, and they now ran them as the first section.

Combination Cylinder Cock.

Mr. H. H. Riggin, an employe of the Philadelphia, Wilmington & Baltimore road, has designed an improvement in substituting one cylinder cock for two, placing couplings in the usual place at each end of the cylinder, with a straight pipe connection to the cock. Fig. 1

shows the passages through this central cock and the stuffing box at the bottom. Figs. 2 and 3 show top and side views, with the lever arm for opening and closing. Stop pins control the throw of the lever at the cpen and Stop pins control the throw of the lever at the epen and closed positions. Fig. 4 shows the cock connected in position under the cylinder. The piping can be placed under the casing when desirable on account of the cylinders hanging low. This single cock and its connections are much cheaper than two ordinary cylinder cocks, and it can be easily removed without disturbing the cylinder connection. It has been adopted on the Wilmighton & connection. It has been adopted on the Wilmington & Northern, and is in use on the Philadelphia, Wilmington & Baltimore and Delaware Division, and is doing satisfactory service on other roads. The Riggin Manufacturing Co., 144 North Seventh St., Philadelphia.

Lighting at Wrecks.

The principal parts of the paper read by Mr. W. F. Taylor, of the Pennsylvania Railroad, before the ninth annual meeting of the Association of Railway Telegraph Superintendents, at Niagara Falls, June 19, were those concerning the electric light car of the Pennsylvania Railroad and the Lucigen and the Wells lights. The Railroad and the Lucigen and the Wells lights. The electric light car is a Pennsylvania freight car fitted up in a manner similar to that shown in the Railroad Gazette of June 21, 1889. The car shown in that issue was one built by the Cumberland Valley, and was larger than the one described by Mr. Taylor, it having been originally constructed for use at picnics. It has a 40 h. p. boiler and 35 h. p. engine, and dynamos with a capacity of 40 lights of 2,000 candle power each. The Pennsylvania's car has a 15 h. p. boiler, 15 h. p. Westinghouse automatic engine, and a 10-light Weston aynamo. The crew consists of an engineer and four linemen. Mr. Taylor cites instances of rapid work in setting up the apparatus at wrecks. In one case seven lamps with %-mile of wire were put in service in one hour; other cases where more wire had to be strung took 1 hour and 30 minutes. In more favorable locations six lamps were set going in 35 minutes. The cost of the car was \$2,500, set going in 35 minutes. The cost of the car was \$2,500, and it costs \$1 per lamp to run it. Mr. Taylor regards this as cheap in comparison with the advantages cured.

The Lucigen light is constructed on the principal of an atomizer, compressed air being used to throw crude hydro-carbon oil out of an orifice in the form of a spray. It requires two men to operate the air pump and four men to handle the apparatus. The Wells light is an apparatus for volatilizing the oil, about 20 lbs. of air pressure being used. A few strokes of the pump every few hours is all that is required to maintain the pressure. Only two men are required to handle the apparatus. For general use Mr. Taylor thinks the high-pressure portable oil light, using enough of them to give 3,000 candle power, are the most practicable, and such an apparatus would be sufficient for the ordinary wreck-



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opin ions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, ether for money or in consideration of advertising patronace.

The Convention of the American Society of Civil En gineers, which came to an end last Monday night, was, as had been expected, a very successful one, but it was the sort of convention to which all the members have become accustomed: that is, the proportion of sack to bread was very large. Notwithstanding the long and fine list of papers, the time actually spent in sessions was really a small part of the total. In this particular, how ever, this convention was a vast improvement on that of 1888, when, out of practically seven days of conven tion (including Sunday and excursions), less than ten hours were available for reading and discussing papers. Probably at the Cresson convention almost every one had about as many hours of work in the sessions as he really wanted, and the opportunities to meet his fellow members were certainly unusually good. One moral of this convention is to keep the conventions away from cities. Probably, ho ver, it is desirable to depart from this rule occasionally, by way of variety. efficiency of the local committee, and the courtesy of the Penusylvania Railroad, which put special trains at the disposal of the committee for several excursions should not be overlooked. To them much of the pleasure of those who were at the convention is due.

New Railroad Construction in 1890.

A table showing the new main line track built in the first half of this year is published in this issue. The table shows also the road under contract or construction and that surveyed or projected.

The new road actually built up to July 1 is 1,898 miles in the United States and 308 in Canada and Mexico. In the first half of 1889 the new road built in the United States was 1,481 miles and the total for the year was 5.300 miles. Preserving the same ratio, we should build this year 6,600 miles. But in 1888 the total for year was only 2.4 times the amount built in first half. If we take the amount of road the year under contract or construction as a basis, we find that the total built in 1889 was six per cent more than the amount under contract in the first This would give us over 6,000 miles for 1890. So far as can now be judged, the total this year will exceed 6,000 miles, for not only is the amount built and under contract greater than at the same time last year, but the volume of business and the earnings of roads continue to show gains over last year, and the market for railroad securities, while still very conservative, is about as good as it was a year ago.

In the distribution of the new work by sections of the country, we follow the same grouping as hereto fore, viz.: Northern states east of the Mississippi, Southern states east of the Mississippi, Southwestern states, including Kansas and Colorada, Northwestern states and the Pacific coast. The percentage of the total track built in each of those groups has been:

0.0 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0 1
	Half of 1890. All of 1889
Southern	54 36
Southwestern	16 18
Northeastern	14 24
Northwestern	10 10
Pacific	6 12

they have increased it. In the first half of 1889 they built 45 per cent. of the total. For obvious reasons the work in that part of the country is likely to be proportionately greater in the first than in the second half The greatest amount of road built by any one state this year is 183 miles, in Georgia. The next is 164. Tennessee, South Carolina and in North Carolina. Montana have also built over 100 miles each. The only other state in the Union which has built as much as 100 miles is Washington.

The chief characteristic of the new construction in the first half year has been, as for two years, short ex-tensions of old lines, but it looks now as if there would be considerable important building of new lines in the second half. The entire amount, so far built this year is by 96 companies averaging less than 20 miles each. But five have built over 50 miles each; the Knoxville Southern leading with 85 miles. The struggle to occupy new territory is chiefly in the state Washington, and the most important comof petitive lines building in old territory are per. haps the new line of the Seaboard & Roanoke to Atlanta, and of the New York, Ontario & Western to the anthracite coal fields. Concerning the geographical distribution and significance of the new road we shall have more to say next week. It is enough to say new that the present condition is one of moderate but solid prosperity.

Some Details of Signaling.

In the paper on signaling printed in another column there is considerable argument on the question as to how long a signal, set "all clear" for a train or engine to pass, should be left in that position. While there are good reasons for both practices, we think there can be no question that, if consistency is to be aimed at, the signal should always be thrown to danger immediately after the engine (or the foremost vehicle) of a train has passed it; in other words, as soon as the signal has actually been used. And the objections to Joint responsibility of conductor and engineer is all right, and many roads could, by the way, greatly improve their service if they would actually enforce this rule instead of merely printing it in their manuals; but if the conductor is to see that the engineer makes no mistakes he should be required to post himself near the front of the train. Many of the collisions reported as caused by running past meeting points occur within 100 rods of the station; how can the conductor check the engineer's blunder in a case like that if he is back in the caboose at the rear of a forty-car train? conductor is ordered not to run past a signal at danger he must interpret the rule to mean that no part of his train shall pass the signal till he sees it. The hind brakeman should know that all block signals passed by his train stand at danger when he leaves them, but to require him to see them move to danger would introduce complications involving more harm than the con responding benefit could offset.

After an operater has set a signal at danger his next act is to take the necessary steps to admit a following train to that portion of the road which has just been vacated, and the only important reason for waiting till the train has wholly passed him before moving the signal is that he will thereby be checked if he mistakenly start to admit the following train too soon. If he puts the signal "on" as soon as the engine has p he may become impatient and try to hasten traffic by violating the rule. But in yards, where many of the trains or parts of train are very short and follow each other closely, the signal must be put to danger promptly. If the signalman waits until the whole of as passed he not only wastes his own time but will often find himself admitting a second train which he really means to hold. Where permissive blocking is practiced the same trouble will be experi-enced with block signals. If, therefore, it is desired to have the practice uniform on the whole of a road the obvious course is to apply the yard practice to all manual fixed signals. It will, indeed, be necessary to discipline block operators so that they will not admit a train to a section before a preceding train has cleared it, but that is substantially what is done with operators at interlocking towers already. The Burlington rule for the guidance of operators when trains break in two is doubtless sometimes useful, but if they were to take similar precautions with a hand flag or lantern they would accomplish no less satisfactory results.

Mr. Nichols does well to throw aside the argument about interlocked signals never being used as block signals. We have thirty years' experience to show the fallacy of that. What is the difference between show-It will be seen that the Southern states keep the lead ing the condition of track and showing "position of that they have held for the last two years; and indeed traffic" (if any one knows what the latter means)?

The case of an engineer keeping his eye on a signal far in advance (which is pulled clear for a preceding train), and thus coming into collision with the train ahead, has actually occurred a number of times in England, as readers of the Board of Trade reports in these columns will recollect; but we have not heard of many cases in this country. Loose discipline and ambiguous rules in the use of distant signals, and careless location of home signals, are largely responsible for most of these difficulties. Many home signals are set in obscure places, but others are placed upon masts which are taller than is really necessary, especially in England. If home signals were placed with more careful study of the ground they would not so often be seen at too great a distance, and if the rate of speed inside distant signals were more closely looked after, engineers being reprimanded for violations, mis-takes of this kind would be much more rare. What does Mr. Nichols mean when he says "circumstances compel high speed" where the rule says that it must be under control? That is just the kind of argument his engineers will like to use when they have violated a rule for the sake of making time. Before using it at headquarters, however, it would be well to read the fourth line of the Standard Code: "If a rule cannot be enforced, it ought not to exist."

The Chicago Strike.

The strike of the Illinois Central trainmen at Chicago came to an end on Friday last, after five days' suspenion of substantially all freight and passenger trains on the divisions terminating in Chicago, and the infliction of great inconvenience on the traveling and shipping public and of probably \$100,000 or more loss upon the railroad company. Much perishable freight was delayed. It was one of the most foolish strikes ever undertaken. E. G. Russell, superintendent of the Northern lines, whose "general obnoxiousness" was the sole cause of the trouble, is retained in office and the company is completely victorious, though the strikers claim that Mr. Russell is to hereafter refrain from giving orders direct to the men (instead of through subordinate officers) and that this in a measure meets their demands. It appears that Trainmaster Berry and his assistant Pushy, whose retirement was the immediate occasion of the strike, were not discharged by Mr. Russell but resigned. One of them took this action because he expected to be discharged, and he will be taken back; the other says he will not work under Mr. Russell on any terms.

It is difficult to estimate the real causes of the strike at this distance, and, judging from the newspaper ac counts. people on the ground are unable to explain it very satisfactorily. The men had no organization that was worth much (all their movements being conducted by mass meetings), and their leaders were dumb when General Superintendent Sullivan talked sharply to them about the irresponsibility of men who inflict such losses upon the road and the community. When some of the strikers referred the controversy (after a day or two) to the higher officers of their brotherhood they received no encouragement, and the locomotive engineers, who seem to have sympathized first, soon concluded that it was beneath their dignity to support such a foolish strike. Not even a statement of the grievances had been presented to the

company at the time the men stopped work.

Many good opinions of Mr. Russell from officers of the Chicago, St. Paul & Kansas City, and other roads on which he has worked, are printed in the Chicago papers, and the employés of a division of the Illinois Central which he formerly superintended, sent him a strong testimonial. Confirmatory of these views are opinions printed in the Railway Review of Chicago to the effect that the Illinois Central trainmen are blanked fools, and that their morale is lower than that of most similar bodies of men; that Russell, being a strict disciplinarian, interfered with the lazy habits in vogue before he took charge, and so incurred their enmity. All this may be so. Laziness and inefficiency qualities not to be endured in railroad service, and yet s the Chicago Tribune says:

as the Chicago Tribune says:

For an army or for an industrial establishment to succeed it is necessary that the general or overseer should have not necessarily the love but certainly the respect and confidence of his subordinates. If he fails to win it they will not fight their best or work their best, and there should be a change for the good of the service. The railroad wants to get out of its trainmen the best service that is in them, just as it wants one of its engineers to get the best results he can out of the engine he runs. If the latter fails, no matter how blameless he may be morally, he is incompetent for his position. If one man can run a thousand employés without friction, while under another there are constant friction and trouble and consequent loss of power, the latter ought to resign. It is for the financial interest of the road that it shall have officers whom the men respect and like.

If Mr. Russell has a conspicuous lack of suavity, he

would do well to put two or three other officers as in excess, and if locomotives in that condition are cushions between himself and his men. He can, indeed, find plenty of superintendents who are not, as a rule, genial when dealing with their men, and who yet retain their places; but they retain them by means of forces which are being gradually but surely outgrown and young men will do well not to copy their methods With the spread of intelligence and organization among railroad employés, the principle that true gov ernment derives its powers from the consent of the governed must receive more recognition. The consent of employés to regulations must be taken into consideration more fully than is implied by a couple of lines in the Train Rules, which are never read by the em ployé after he begins his service.

One of the charges was that Mr. Russell "prowled around nights." A superintendent certainly has a perfect right to inspect his men's conduct at any tin the day or night, and many of the most successful one and those best liked by their subordinates do considerable "prowling" as a good way of posting themselves. Of course no faithful employé can object to having his work squared with the highest standards. But the superintendent must be consistent and conscientious, and must surround his firmness with a trimming of gentleness and much discretion. A single unjust punishment as a result of a mistake in observa-tion on his own part will neutralize the value of his personal inspections for a long time.

The Chicago papers state that no policemen were to be seen around the Illinois Central yards; and we read in another column that the strikers "saw that no one in. terfered with the cars and engines" which means, we suppose, that no one was allowed to interfere with their purpose to prevent cars and engines being moved. Whether the road made any persistent effort to run its trains during the strike we do not know; the reports do not indicate that it did; but it would seem to be a lamentable state of affairs where striking employés do as they please with the property of a company they are fighting. A similar condition has existed in other strikes though the roads have generally made some pretense of excluding law-breakers from their premises and it looks as though the lack of policemen in the Chicago yards was disgraceful to the railroad or the city or both. The strike was so sudden and so illogical that the managers of the road may well have been dumbfounded at first, especially if they knew that the charges against Russell were partially just; but if they made no effort to run passenger trains, nor even to hold free possession of their engines and cars, the conclusion is almost irresistible either that the strikers were more powerful than the law, or else that the railroad managers weakly feared such to be the case.

Running Locomotives with the Rods Down

Several cases where rails have been badly bent, and the track seriously injured have come to light in which the counterbalances in the locomotives were found on investigation to be quite correct, and it was only after considerable search that the true cause of the damage was found. The conditions which brought about these results are common, and it is worth while to call attention to the matter. One case resulted from the shipment of a locomotive, light, over the road, and another from allowing a disabled locomotive to run in at considerable speed with the rods down on one side. Nearly all railroads accept, as freight, locomotives for foreign roads with the side rods off, not realizing the possible injury to the track. This liability may be better appreciated by a statement of the exact amount of rail pressure that may be produced on the rails by a locomotive in the usual conditions of shipment.

Take the case of a consolidation engine having wheels 48 in. in diameter. Such a locomotive has a counterweight weighing, in some cases, about 550 lbs. the centre of which is about 14 in. from the centre of the wheel. If the machine is shipped light, that is, without rods, this counterweight is not counterbalanced except by the crank pin and hub, the weights of which are about 170 lbs., leaving a remainder of 380 lbs. of unbalanced weight. At 50 miles an hour, which is not an unusual speed to be attained by freight trains on grades, the pressure on the rail caused by this counterbalance is about 18,000 lbs. in addition to the weight of the locomotive. This pressure is suddenly applied and considerably exceeds that which has existed in cases where overbalanced 8-wheelers have badly injured the track. With large 8-wheelers, having heavy reciprocating parts reasonably well bal-auced, the pressure caused by the excess of balance seldom exceeds 12,000 lbs. It is evident that much care should be taken in receiving locomotives for shipment, and the same is true where a disabled engine is run in with one side down. The removal of engine is run in with one side down. The removal of the rods leaves a large portion of the counterbalance way daily over the entire system, and the car-azle mile-

moved at high velocities, the effect on the rails will b disastrous. The Chicago, Milwaukee & St. Paul road has limited the speed of disabled locomotives to ten miles per hour, and some regulation should be made by every road to limit the speed, or in some way to prevent excessive rail pressure in the case of engines taken for shipment with the rods down.

These are facts which will appeal to almost any The trouble is not so great with locomotives having large wheels or with lighter engines. It is the small wheeled engines, such as switchers and consoli-dations, that require the most careful examination. The limit of speed at which it is safe to run different types without side rods is not the same for all. The maller the wheel and the heavier the counterbalance the lower the limit; and the larger the wheel and the s the counterbalance, the higher the limit.

There are four principal ways of obviating the difficulty: First: Ship all locomotives with the rods in position. Second: Place a counterweight on the crank pins equivalent to the rods removed. Third: Remove the counterbalances and rivet them in after the locomotive has reached its destination. Fourth Limit the speed at which the locomotive shall be run when the rods are removed. Evidently there are also other ways of accomplishing this end, but these seem to be the most convenient, and the Evidently dangers of each individual case may be remedied by adopting any one of these precautions.

Statistics of German Railroads.

The annual statistical report of the railroads of the whole German Empire for the fiscal year ending with March, 1880, shows that at that date there were 25,536 miles of railroad in operation, an increase of 452 miles during the year, which was a year of unusual prosperity, and especially profitable for the railroads. This small and especially profitable for the railroads. This small increase of mileage, which appears insignificant to us for a nation of 48,000,000 of people, indicates that the country is now pretty well supplied with lines, though if the railroads were left to private enterprise, and that was free to build when and where it pleased, there would still probably be much more construction during prosperous years, but much of such construction would be for the duplication of existing profitable lines, and be on the whole a disadvantage to the country. Of the whole German railroad mileage, 509 miles are of

narrow gauge, mostly very short lines, and mostly constructed in recent years. During the last year 72 miles of narrow-gauge road were opened, or nearly one-sixth of the total new road.

Out of the total 25,536 miles of rathroad 22,256 miles were worked by the different governments included in the empire, leaving only 3,280 miles, or little more than one-eighth of the whole, worked by companies. Besides this mileage there were 1,370 miles of private lines, connecting factories, mines, etc., with the railroads, but

The largest system in Germany worked directly by a single management seems to be that of the Bavarian state railroads, which includes 2,886 miles. The Prussian state railroads, 14,440 miles, are divided into numerous systems, each managed by a separate management, or systems, each managed by a separate management, or "directory," the systems varying greatly in extent and composed of lines which can be conveniently worked together. The longest mileage is worked by the Bromberg Directory, 2,516 miles. At Cologne there are two directories, one working 1,146 miles on the left bank of the Rhine, and the other 1,273 miles on the right bank—the two together, according to our notions, making only one fair-sized system. But there are some ed by separate directories, as the following list will show:

Miles. Directory.
693 Elberfeld
1,916 Erfurt
1,771 Frankfort-on-Maine.
2,516 Hanover.
Magdeburg Directory. Altona.... Berlin.... Breslau... Bromberg. Cologne: Left bank of Rhine..... Right " " " . 1,146

The largest system is in the extreme eastern part of Prussia, where the mileage in proportion to territory is smallest, so that the territory covered by it is very much larger than that of any directory. As it covers the whole Russian border, strategical reasons may have much to do with this; and as all the different manage ments are under the Minister of Public Works, and there is no competition with each other, it is not necessary to

is no competition with each other, it is not necessary to put lines together to secure harmonious management. There is in all Germany one mile of railroad for every 1,880 inhabitants, while in this country there is a mile for about 400 inhabitants; and this is a difference of profound significance, which has a very great effect not on traffic only but on construction and working. There is a station or other stopping place on the average every 5.69 miles on the German roads. The narrow gau every 5.69 miles on the German roads. The narrow gauge roads average a stopping place (often with no structure and not even a platform) every $1\frac{1}{4}$ miles.

The equipment per 100 miles of road was:

Standard Freight and baggage cars.
52.1 95.5 baggage cars. Locomotives.

Mail cars

age 384 car-axles each way daily, or a little less than 192 cars of all kinds, the number of cars with more than two axles being a very small proportion of the whole. This is a little less than 20 cars per train. Of the axle mileage, just about four-fifths was under freight cars, indicating an average reight car movement of just about 154 cars are way daily even the whole miles of the Empire. ch way daily over the whole mileage of the Empire.

each way daily over the whole mileage of the Empire. As has been remarked, the year was a very favorable one. The number of passengers carried was about 7½ per cent., and the number of tons of freight 11½ per cent. greater than the year before. As usual, it was the low-priced traffic that increased most, and the increase in passenger earnings was but 5½ per cent., and in freight earnings 8 per cent., while the total gross earnings increased 7 per cent. The working expenses increased a little less than 8 per cent., leaving an increase of 6 per cent. in net earnings, amounting in the aggreof 6 per cent. in net earnings, amounting in the aggre-gate to \$7,575,000. The working expenses were 53.11 per cent. of the earnings; and the net earnings were 73 cents per train mile. Per mile of road the net earnings were \$5,320, which was less than 3 per cent. more than in the

The railroads, and with them the public, have reason to ongratulate themselves on the fact that the anti-trust law does not include a prohibition of contracts and traffic agreements between railroad companies. The meagre press reports have given very little information concerning the discussions in the two Houses of Congress and in committee, and in conference between the two houses, over the various propositions to "crush the railroad". over the various propositions to crush the railroad monopolies" by means of a clause in this bill, but there has really been a prolonged contest. A valued correspond-ent has sent us an interesting account of these proceedings, but we regret that we have not the space to pub-lish it. Messrs. Bland, Anderson. of Kansas; Lind, Hill, Stockdale and Culberson, voiced the usual arguments about extortion and the demand for imprisonment of railroad directors, while Messrs. Morse, of Massachu-setts; Mason, of Illinois, and Stewart, of Vermont, took the moderate side. The reasonable view prevailed and the measure, as now before the President for his signature, is in precisely the form in which it was reported to the Senate by the judiciary committee two months ago.

It is "An act to protect trade and commerce against unlawful restraint and monopolies." By it every contract, combination in the form of trust or otherwise, or conspiracy in restraint of trade or commerce, among the several states or with foreign nations, is declared to be illegal. It is further provided that every person who shall monopolize or attempt to monopolize any part of the trade or commerce among the several states or with foreign nations shall be deemed guilty of a misdemeanor. The other provisions of the bill provide penalties and a procedure for their enforcement. Contracts in restraint of trade or commerce and the monopolization of trade or commerce are declared to be illegal, and offenses of that character are punishable by fine or spiracy in restraint of trade or commerce, among the and offenses of that character are punishable by fine or imprisonment, or both. Whether this law will apply to the case of a senseless strike like that which suspended traffic on the Illinois Central for five days last week, so traffic on the Illinois Central for five days last week, so that such short-sighted men, who do not scruple to inconvenience thousands, without taking a second thought, can be punished, we do not know. It is to be hoped that it will, although there are plenty of reasons apparent why its enforcement would be difficult, and the punishment might, perhaps, be found useless, even if the law should be found to apply.

The Rio Grande Western is now standard gauge its entire length. Through standard gauge trains are run-ning between Ogden and Grand Junction, and a through arrangement has been put into effect with the Southern Pacific, making Grand Junction the point of transfer to the narrow gauge cars instead of Ogden. The standard gauge is not yet completed on the Denver & Rio Grande proper, and it probably will be two months before trains are running through to Denver via the new Midland and Rio Grande route. The history of the narrow gauge Rio Grande system is extremely interesting; built as it was, through a territory without competition, a com-plete system in itself, with a large business at high rates, the road made money regardless of poor mana The road was so located that the break in gauge The road was so located that the break in gauge did not cause any great annoyance or expense. That time has past, and the great prosperity in the West has brought other roads into the territory of the Rio Grande, and it has had to drop its individuality and become part of the great system of standard gauge roads. The day of narrow gauge roads is over, and no other body of men will think it economical to build three-foot roads for

The Delaware, Lackawanna & Western has just granted the request of some of its passenger brakemen and baggage masters to furnish them with new uniforms twice a year at the expense of the company. It appears that the conductors are already supplied with uniforms on this basis, under an arrangement which has uniforms on this basis, under an arrangement which has been in force some time. This is a graceful way of slightly increasing the men's wages, and would be a good thing on certain roads where the appearance of some of the men indicates that the company (or some one) ought to give them a hint as to when the proper time arrives for replacsome of the men indicates that the company (or some one) ought to give them a hint as to when the proper time arrives for replac-ing old uniforms by new ones. A superintendent feels some delicacy about throwing out such hints, especially where the slovenliness of the man is not of a pro-nounced character, or where his family expenses are known to be so large as to make his wages inadequate to fairly meet them. Under such circumstances a uni form furnished by the company not only affords a convenient means of encouraging neatness, but also opens the way to demand other improvements in service.

On the Central Pacific Railroad the cylinders of the locomotive have been utilized to increase the supply of air to the brakes. This is accomplished by reversing the locomotive when it is going ahead, thus causing the the locomotive when it is going ahead, thus causing the cylinders to act as air compressors, driving large volumes of air into the train pipes and reservoirs. To accomplish this a pipe is taken from the top of the steam chest to a safety valve, and thence to the air drum on the locomotive. The reverse lever is hooked about one notch back of the centre for ordinary occasions. When a large amount of air is required it is hooked still further back This arrangement has been in use about one year, and since that time there has been no difficulty from lack of air on grades, even with trains of considerable length. This arrangement for obtaining air is known as the Sweeney patent.

TRADE CATALOGUES.

The F. C. Austin Mfg. Co. of Chicago has issued a new and fine catalogue of its contractors' implements. These devices include the New Era graders, scrapers and plows; also the Austin steel road machines. This catalogue has 80 pages, and contains fine engravings of all the varieties of the machines at work. It also has an argument on the preparation of roadways and the relative merits of different graders. The information in this publication is useful to every civil engineer or contractor interested in the construction of earth-works.

The Michigan Central Railroad has issued a catalogu of the summer tours over its lines to points of interest in the East, North and West which contains descriptions of the various cities and public buildings therein together with much information with regard to connect tions to reach the summer resorts. There is also a list of fares and a topographical map of the White Mountain region. This pamphlet will be furnished on applica-

Variations in Economy of Locomotive Boilers with Different Lengths of Tubes, Fire Brick Arches and Water Arches.

The Paris, Lyons & Mediterranean Railroad has been experimenting for the last few years to determine the best conditions for economy in locomotive boilers having different lengths of tubes, fire brick arches and water The experiments have been carefully and sys tematically made by M. A. Henery, Ingenieur en Chef du Matérial et de la Traction, with a view to determine the exact influence of the length of the tubes; not only with reference to economy, but with reference to the rapidity of steam generation. A special boiler was built with the same fire-box as is used on the passenger locomotives of the road, and with tubes of the same diamemotives of the road, and with tubes of the same diameter. The length of the tubes could be changed from 23 ft of 6½ ft., if desired. To accomplish this, the boiler was formed of a series of rings which could be bolted together to produce any length desired. The following are the principal dimensions of the boiler used:

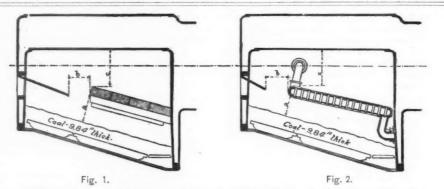
Number of tubes	185
Diameter of tubes, exterior	1.97 in.
Diameter of tubes, interior	1.81 in.
Total section of the interior of the tubes	3.32 sq. ft
Total section of the interior of the ferrules at the	
end of tubes	2.03 sq. ft
Surface of the grate projected on a horizontal	
plane	24.2 sq. ft
Ratio of the section of the tubes to the grate	0.137
Ratio of the section ins de of the ferrules to the	
grate	0°4
Heating surface of the fire-box	109.3 sq. ft

The steam produced by the boiler was with the same dryness as that of the locomotives in actual service. It was allowed to escape into the atmosphere, except a small portion which fed a blower. The feed of the blower was regulated so as to obtain the desired vacuum, which was measured by a water gauge between the ash pan and the smoke box. The preliminary trials showed that a vacuum of 1 in. of water is sufficient for locomo-tives of the type experimented with where they do not have a maximum load; 1.77 in., where they have a nor-mal maximum load, and 2.95 in. for the highest maxi-

Besides the knowledge of the influence of the length of tubes, it was desired to ascertain the value of the brick arch (see fig. 1) and Tenbrink boiler. The Ten-brink boiler has a water arch, as shown in the cuts herewith, fig. 2. The fire-box of the boiler experimented with was made in such a manner that either the water arch or the brick arch could be used, as desired:

Observations made.—Experiments were instituted with

tubes varying from 21.6 ft. to 9.3 ft., each with four series of trials; that is, one each with the ordinary fire-box; with long arch, with short arch and with the Tenbrink boiler. Each of these series of trials was made with three different amounts of vacuum in the smoke box, one each with 1 in., 1.77 in. and 2.95 in. Each trial lasted about three hours. During the tests the following observations were made. The quantity of coal used, the weight and temperature of the feed water, the quantity of cinders produced, the chemical compo



EXPERIMENTS ON LOCOMOTIVE BOILERS WITH TUBES OF VARYING LENGTHS.

the gases in the smoke box, and the quantity of water entrained with the steam. The coal used was La Briquette de Mariemont, with infusible cinders. Its composition and heating power were the same through all the experiments. The average composition is as fol-

Carbon							×	k			 *			 							 					 	. 1	32.8
Hydrogen	٠			٠		*			*		*		.,			٠	*							* 1		 		4.2
Oxygen				 			 			٠				٠	٠										 	 		6.5
Water		×				 				×	 															 		2.2
Cinders		0	0				 				 									 								4.1
Total					 																	 					.1	00

The average calorific power determined by me a calorimeter was 14,250 heat units per pound of raw coal.

Numerous preliminary experiments had to be made to get the apparatus in satisfactory working order, particularly to get systematic and uniform combustion in the fire-box. The conclusion after the preliminary trials was that it was best to charge the fire at the moment when the temperature of the gases began to diminish in the smoke box, after having remained for a certain time at a maximum. Such a plan was followed in all the trials, with the result that repeated experiments under the same conditions gave the same results. The ther mometer in the smoke box caused an electric bell to ring, which was a signal for the fireman to charge the fire By careful attention the layer of coal was always the same thickness whenever the bell rang.

To avoid all uncertainty as to the quantity of coal re-

maining on the grate, the trial was always begun and

finished on the tinkling of the bell.

The boiler was fed by a powerful injector from tanks The boiler was fed by a powerful injector from tanks filled with water and graduated accurately. The water lost at the overflow of the injector was measured in tanks equally well graduated. Every possible attention was paid to obtaining the most accurate results. The water evaporated by the boiler was represented by the volume taken from the feeding tanks diminished by the volume collected in the tank at the injector overflow.

The ashes were collected after each trial from the grate, ash pan, fire-box and tubes. Also those which would be otherwise carried off by the gases of combustion were collected by a special apparatus in the smoke box after they were intimately mixed with the others, and then the weight was determined of the average composition of the whole for each trial.

During each trial frequent analyses were made of the ases in the smoke box, using the Orsat apparatus, into which the gases were rapidly driven by a small steam injector. In addition to this, an aspirator of slow action was actuated during the whole trial and extracted from the smoke-box gases a certain volume of gas which represented an average of the whole trial. These samples were also analyzed. Every attention was paid to keep ing the joints tight, so that no air would be admitted into the gas samples or smoke box.

The temperature in the smoke box with the long tubes could be measured by a mercurial thermometer, but with the short tubes a pyrometer had to be used and an air thermometer with a metallic reservoir. This appar-atus was not precise enough to give the real temperatures, but was of value to indicate the variations of temperature during the trial, and to that end it was con nected with a registering apparatus, which also actuated the electric bell which gave signals to the firemen.

To determine the entrained water, a certain quantity of steam was passed into a calorimeter met by a surface condenser. During each trial note was made of

The total weight of water gathered in the condenser. The total weight of cold water which had circulated around the condenser.

The temperature of the steam at the entrance of the

The temperature of the water of condensation at the The temperature of the refrigerating water at the

entrance and exit.

It was found that water carried off by the steam was very small when the steam had passed through the separator into the dome, but when taken from the boiler direct larger quantities of water were entrained.

In the diagrams herewith are shown the coal burned per hour, the water evaporated per hour, the water evaporated per kilogram of coal and the average temperatures in the smoke box under three different vacuums, before mentioned. An examination

sition of the gases in the smoke box, the temperature of | of the diagrams shows that the activity of the combu

tion varies with the nature of the fire-box, the lengths of the tubes, and the vacuum about as follows:

First. It diminishes when brick arches or the Tenbrink arch are used. It is the most reduced with the long arch. The Tenbrink and the short arch have perceptibly the same effect. The reduction of the rapidity of the combustion brought about by the longer arches is less when the draft is small, and to the contrary when the draft is heavy, the reduction in the activity of combustion is greater.

Second. The activity of combustion increases as the lengths of the tubes diminish. The increase varies from 11 to 19 per cent. This increase, with the decrease in length of tubes, is less marked when the vacuum is

Third. The activity of combustion increases in great proportion when the vacuum increases in great proportion when the vacuum increases, particularly when the vacuum is changed from 1 in. to 1.77 in. The coal burned per hour varies from 23 to 31 per cent., according to the equipment of the fire-box and the length of tubes. It changes from 22 to 29 per cent. when the vacuum is changed from 1.77 in. to 2.95 in. The influence of the vacuum is practically the same no. The influence of the vacuum is practically the same, no matter what the fire-box is. It diminishes slightly, but regularly, as the tubes are shortened.

With regard to the evaporation per hour:

First. The long arch diminishes it always, but diminishes it less when the tubes are long. The short arch diminishes it for the long tubes and increases it for the short tubes. The Tenbrink arch affects the total evaporation per hour in a manner similar to that in the sho brick arch, but more energetically.

Second. The rapidity of evaporation increases continuously with the decrease in the length of the tubes, reaching a maximum for the lengths about 12.4 ft. to 14 ft.; but the evaporation per hour diminishes when shorter tubes are used. With the brick arch or the Tenbrink archethe effect of the changes in the length of tubes is perceptibly the same, but generally the effect of such change is less with than without the arches when short thes are used.

Third. The increase of vacuum increases the evapora-

tion per hour in the same manner, but in a less degree than it increases the activity of combustion. With regard to the economical operation of the boiler,

the following conclusion resulted from the experiments: First. The long arch increases the economy most when the tubes are short and when the vacuum is greatest. The short arch operates in the same direction but in a less degree. The Tenbrink produces sensibly the same effect as the long arch. With ordinary vacu-um of 1.77 in., and for medium lengths of tubes, the short arch increases the economy 6 per cent.; the long long arch and the Tenbrink about 8 per cent.; the improvement reaches 9 and 12 per cent. for tubes of 10.3 ft.

Second. The economy diminishes constantly when the tubes are shortened, and more rapidly for the shorter engths.

Third. The economy diminishes when the vacuum is greatest, the diminution being greater with the shorter subes. The diminution is greater in this case with the ordinary fire-box than with fire-boxes with arches. It is greater for the short arch than for the long and the Tenbrink.

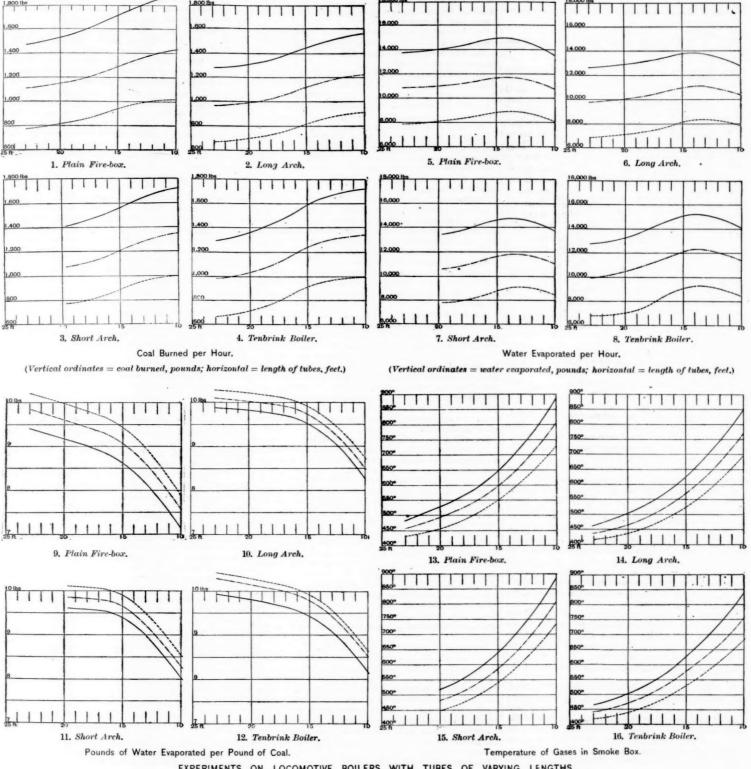
With regard to the cinders produced from the equal

mounts of coal burned:

First. The presence in the fire-box of an arch of any sort diminishes the cinders very much. The diminution is greater with the long arch than with the short, but for the ordinary vacuum the effect is sensibly the same for the long, short and Tenbrink arches. The weight of cinders is reduced about 45 per cent. by the use of an

Second. In general the long tubes result in a larger amount of cinder for moderate vacuum than the short tube. For a strong vacuum the difference is much di-minished, and it is not easy to distinguish any difference in the amount of cinder with a strong draft, whatever be the length of tube. The draft influences almost directly the quantity of cinders produced, and within the limits of the experiments made the cinders are sensibly proportional to the vacuum.

The gases in the smoke box:
First. The addition of a brick arch or a Tenbrink arch always gives more complete combustion. The effect of



EXPERIMENTS ON LOCOMOTIVE BOILERS WITH TUBES OF VARYING LENGTHS.

the long, short, and Tenbrink arches appears to be the |

Second. The influence of the lengths of the tubes on the completeness of combustion appears to be inappreciable

Third. Third stronger the draft the less perfect the combustion in the fire-box. The influence of a strong draft, however, becomes feeble when the arches are grant, however, becomes feeble when the arches are used, and one may say that when the fire-box is provided with an arch of any sort that the perfection of the combustion does not vary sensibly with the vacuum.

With regard to the volume of air used for the consumption of one kilogram of raw coal, this varies but little:

First. It is larger for the ordinary fire-box than for fire-boxes with arches.
Second. The length of the tubes seems not to have

any definite influence thereon.

Third. It diminishes as the draft increases.

With regard to the temperature of the gases in the smoke box:

smoke box:

First. The use of an arch of any sort reduces the temperature in the smoke box. The effects of the long arch and the Tenbrink are sensibly the same. The longer the arch the greater the reduction.

Second. The temperature in the smoke box increases constantly as the tubes are shortened. The variation produced by the shortening of the tubes are greater as the draft is increased. This is true whether the fire-box has arches therein or not.

Third. The temperature increases always with the ine of the vacuum

With regard to the efficiency of the boiler as an ap-paratus for the combustion of coal:

First. It is less efficient for the ordinary fire-box than for those with arches.
Second. The length of the tubes does not appear to

act upon this efficiency.

Remarks: From the observation could be determined the proportion that exists between the heat realized and the heat which would have been produced if the coal had been completely burned. That proportion represents the economical efficiency of the boiler now being considered. The heat utilized is taken as that remaining when from the actual heat in the coal used, by calculation there is subtracted the heating value of the unconsumed carbon in the gases and cinders in smoke box, tubes and ash pan.

ash pan.

Third. The efficiency diminishes constantly as the vacuum is increased. The diminution is more marked with the ordinary fire-box than with those with arches.

With regard to the economy of the boiler considered as an apparatus for the transmission of heat from the coal burned to the water in the boiler:

First. The addition of an arch or Tenbrink device to the fire-box increases distinctly this economy except with extremely long tubes. The increase is greater with the shorter tubes and heavy draft. The influence of the Tenbrink is greater than that of the long arch. The long arch increases the efficiency more than the short arch.

Second. This efficiency decreases rapidly when the tubes are shortened. The decrease, however, is more rapid with the ordinary fire-box than with the fire-boxes

With regard to the heat carried away by combustion: With regard to the heat carried away by combustion: First. The proportion of heat carried off by the gases is perceptibly greater with the ordinary fire-box than with the fire-boxes with arches. The losses are generally smaller with the long arch than with the short arch. The influence of the Tenbrink device is about the same as that of the longer arch, and is always greater than the safe the short arch. that of the short arch.

Second. This wasted heat increases constantly as the tubes are shortened and the increase is more rapid where the draft is stong.

Third. This waste increases with the draft. With regard to heat lost by conduction and radiation: First. This is greater for the ordinary fire box than for those with arches. It is the Tenbrink that gives the

Second. This loss increases rapidly as the tubes are

Third. It increases with the draft, and more rapidly

Third. It increases with the draft, and more rapidly increases with the draft when the tubes are short.

With regard to the distribution of the total heat in the coal, the table herewith shows how the total heat in the coal is distributed in the four following directions, taking the total at 1,000 parts:

First, at A, in carbon remaining in the cinders and in the gases of combustion.

EXPERIMENTS ON LOCOMOTIVE BOJLERS WITH TUBES OF VARYING LENGTHS—DISTRIBUTION OF THE TOTAL HEAT OF COAL BURNED.

ength of tubes, feet.	tum in		dina in f	ire-		th l			h si k ar		W	ith '	rch.
Len	Vacuum ins. of wa	1	1.77	2.95	1	1.77	2.95	1	1.77	2.95	1	1.77	2.95
21.7	A B C D	80 833 89	90 800 94 16	120 752 96 32	50 845 82 23	60 815 87 38	60 800 94 46				70 836 82 12	50 855 90 5	90 800 94 16
18.6	A B C D	60 840 96 4	80 802 101 17	120 730 103 47	50 838 85 27	40 840 94 26	80 796 97 27	60 832 94 14	60 816 100 24	801 110 29	60 843 88 9	60 838 94 8	70 808 100 21
15.5	A B C D	70 800 106 24	80 772 113 35		30 817 96 27	50 817 102 31	40 816 110 34	40 844 104 12	10 843 115 32	50 800 121 29	40 835 98 27	50 825 103 22	40 807 115 41
14.0	A B C D	50 793 117 40	110 740 118 52	80 720 131 69	50 803 102 45	70 777 109 44	86 755 115 50	30 830 112 28	70 781 117 32	100 746 123 31	60 800 103 37	30 835 115 20	80 771 111 35
12.4	A B C D	80 728 126 66	697 132	653 138	40 787 112 61		50 753 133 64	50 771 119 60	60 762 131 47	70 744 140 46	40 799 119 42	50 784 126 40	56 762 136 5
10.8	A B C D	80 699 143 78		625	70 745 121 64	50 746 137 67	80 709 146 65	60 737 131 72	60 721 145 74	80 690 153 77	60 742 131 67	80 720 138 62	708 150 75
9.3	A B C D	60 667 164 109	80 631 175 114	120 579 187 114	50 714 140 96	80 676 148 96	171	60 693 147 100	40 690 165 105	80 647 169 104	50 722 148 80	40 716 162 82	70 671 466 98

Second, at B, the heat absorbed in the steam produced. Third, at C, the heat carried off by the gas bustion

Fourth, at D, the heat lost by radiation and conduct

Influence of the number of tube

It often happens that certain tubes are obstructed in service by cinders or for other reasons. Supplementary experiments were made to determine the effect of stopping up tubes in a locomotive boiler in service. Th esults are about as follows:

The coal burned and the water evaporated per hour

decrease as the number of tubes decreas

The water evaporated per kilogram of coal burned emains perceptibly the same for the ordinary fire-box after some of the tubes have been plugged, but appears

For the same fire-box and the same work the plugging of a number of the tubes does not change much the economical production of the boiler, but diminishes its power in a little less proportion than the proportion of the number of tubes suppressed. Therefore, to obtain the number of tubes suppressed. Therefore, to obtain the same power after a number of the tubes are plugged the draft must be increased, which will result in a creased economy of operation.

In considering simply the three principal elements of locomotive boiler operation, namely, the activity of the combustion, the rapidity of steam generation, and the economy of the boiler, the results obtained by these exeriments may be stated as follows:
With regard to the influence of the character of the

fire-box:

The addition of an arch or Tenbrink device diminishe always the activity of the combustion, but the rapidity of steam production varies as follows: The long arch of steam production varies as follows: The long arch shows a decrease of 2 to 10 per cent., according to the length of tube. The short arch occasions a maximum decrease of 4 per cent. The Tenbrink device shows an increase reached as high as 5 per cent.

The economy of the boiler is always better with an arch or Tenbrink device than with the ordinary fire-box. The short arch shows an increase of economy of 6 to 9

per cent., the long arch or Tenbrink from 8 to 12 per cent. This benefit is greater when the tubes are shorter and the draft more energetic.

The influence of the length of tubes with reference to

the three principal elements before mentioned:
The activity of combustion continually increases the tubes diminish in length, but the increase is less rapid when the draft is most energetic. The rapidity of the evaporation increases continuously as the tubes are shortened, until it reaches a maximum at a length between 12.4 ft. and 14 ft. After that it decreas

The efficiency of the boiler is much less when the tube are short. The decrease is at first very slow to the length of tubes to about 12.4 ft. It accelerates rapidly for tube lengths less than this, so that when the tubes are shortened from 15.5 ft. to 12.4 ft. there is a loss of 5 per cent. in the fire-box provided with an arch or Ten-brink, whereas 10 per cent. is lost when the tubes are shortened from 12.4 ft. to 9.3 ft. From 15.5 ft. to 9.3 ft. the total loss is 19 per cent. with the ordinary fire-box and 14 per cent. with the long arch, 16 with the short arch, and 15 per cent. with the Tenbrink device.

Influence of the draft:

When the draft incre regularly from 1 in. to 1.77 in. of vacuum. This increase is more rapid when the draft is greater. It is perceptibly the same no matter what the fire-box is and what may be the length of tubes.

less rapidly. This increase is gradually less rapid as

the draft increases. The length of the fire-box and the length of the tubes seem to have no perceptible influence on the rate of increase.

The economy of the boiler diminishes constantly as the draft is increased, the diminution being more rapid as the tubes are made shorter. The total variation of the economy is as follows:

For the ordinary fire-box 9.3 per cent. of its economy at 1.77 in vacuum. For the short arch 5.6 per cent. of its economy at 1.77 in vacuum. For the long arch and Tenbrink 4.7 per cent. of its economy at 1.77 in.

Influence of the number of tubes:

When the number of tubes are diminished without changing their diameter, the rate of combustion and the water evaporated decrease in a proportion a little less than the ratio of the decrease in the number of tubes; but the economy of the boiler remains almost exactly the same.

Conclusion:

In locomotive engines, the rapidity of steam generation being generally the ruling element, it is necessary to obtain all the conditions which assist to that end, unless such conditions give rise to some inconveniences too serious from other points of view. Therefore, from what precedes the following conclusions are drawn:

Regarding the construction of fire-boxes:

It is necessary to adopt the short arch or the Tenbrink device, which have tubes of 12.4 ft to 14 ft. and less in length

The choice between the short arch and the Tenbrink only depends upon the condition of maintenance of paratus; but if such maintenance is not to be con ered from an economical point of view by reason of the interest on the capital employed, one must not hesitate to adopt the Tenbrink, remembering, however, the maintenance of which may occasion some additional expense; but practically it does not seem to present any erious difficulty, and we do not consider any difficulties vill arise from adopting it in preference to the short arch. Its use increases about 3 per cent, the rapidity of steam production.

Regarding the number and length of tubes:

The lengths of 12 ft. and 4 in. to 14 ft., which insures a maximum of steam production within reasonable limits of economy, seem preferable. If an excess of weight is not feared, the length of 14 ft.

is better, as the economy is greater; but above this length, if one seeks to gain weight of the locomotive, the difficulty will arise because of the loss in power occasioned by lack of steam production. It is preferable

to increase the weight by other means.

On the other hand, if one wishes to decrease the weight of the machine, it is not impracticable to decrease the length of the tubes to 12.4 ft.; but below this length one recedes more and more from the maximum power, and the economy is also considerably reduced. Lengths less than this must not be used only when the weight must be reduced at all costs. If the length be reduced from 15.5 ft. to 9.3 ft., there would be a great reduction in steam production and a loss of economy of about 15 per cent.

Regarding the smoke-box vacuum;

The influence of the vacuum on the steam production is so considerable that it is best in spite of its action on economy to do all possible to make provision for varying its intensity between the widest possible limits. A varia tion in the vacuum is the best means of giving to the locomotive a wide range of power and to enable the regulation of that power to suit sudden demands made upon the engine. It is, however, best not to increase the vacuum beyond a certain limit because of the b pressure in the cylinder.

Regarding the number of tubes:

The number of tubes should be increased as much cossible within the limits of ordinary design, but must be remembered that nothing is gained by such increase, except in power. No gain is noticed in eco

The experiments are being continued, and at some future time we may expect to hear from these engineers regarding the effect of various diameters of tubes, and also with regard to the action of various exhaust pipes and nozzles. These experiments have been carried with the utmost accuracy, and the results may be taken as comparable with those that may be expected under similar conditions elsewhere.

Coupler Tests at Old Point Comfort.

During the Master Car Builders' convention at Old Point Comfort a trial was made of the Fox and Van Dorston car couplers. The Van Dorston coupler was on Philadelphia & Reading box cars and the Fox coupler on Chesapeake & Ohio flat cars. Several trials were made at ordinary speeds and the results were satisfactory. The Van Dorston failed to couple once, because of imperfect couplers. Several endurance tests were made with speeds varying from ten to twenty miles per hour. No damage was done to either coupler, but it must be stated that the cars were not loaded and that the Van Dorston had a rubber buffer at the back of the stem: or more rapid when the draft is greater. It is perceptiby the same no matter what the fire-box is and what
may be the length of tubes.

The evaporation varies like the rate of combustion, but
less rapidly. This increase is gradually less rapid as

the severity of the blows would have been much greater, the force of the blow being about in proportion to the weight when the velocity remains the same.

In this test one most instructive result was obtained. At the highest speed, namely, 20 miles per hour, the Van Dorston couplers were driven together with the knuckles closed and locked. Under the force of the blow, without unlocking, the couplers coupled together; that is, the knuckle of one slipped into position without raising the locking pin of either. This is not a desirable action for a vertical plane coupler to have, and is brought about by the springing of the parts, or by the use of a contour which is not as full at the bearing points, particularly at the heel of the knuckle, as are the Master Car Builders' standard lines. Several tests are on record, in the case of other designs of the vertical plane coupler, where this other designs of the vertical plane coupler, where this action has taken place without unlocking the knuckles, but in every case the lines were different from the standard contour, as they were in the Van Dorston in these tests, and to this may be attributed the main reason for coupling without unlocking under heavy blows. In the test above cited the blows were very beavy, as may be seen from the feet. the blows were very heavy, as may be seen from the fact that one of the box cars was thrown off the track. Nevertheless, if these cars had been loaded, they probably would not have left the track and the blow would have been much more severe. As it was, however, the flanges on the draw-heads were driven into the wood end sills about three-fourths of an inch.

One conclusion can be drawn from these tests, and that is, while they did not show the comparative strengths of the couplers, yet they did show that they are sufficiently strong, when mounted as they were in the tests, to resist 99 per cent. of the blows service, as it is not probable that more than 1 per ce of the coupling in actual service is made at the velocity at which these cars were driven together.

Balancing Two Cylinder Compound Locomotives on the Northeastern Railway.

In a private letter regarding the methods of balancing the high speed compound two-driver locomotives on th Northeastern Railway, England, Mr. T. W. Worsdell, Locomotive Superintendent, writes:

We use an average weight in counterbalancing; that is to say, the same amount of counterbalance on both sides of the locomotive; but you must bear in mind that the application of our engine power is almost central, having crank axle inside the frames only 2 ft. cen-

es, which accounts for that.
"We have kept the balance weights somewhat lighter than the usually acknowledged method of calculation would indicate, as the high speed of the periphery at such a distance from the centre of the driving wheel has so far indicated that we do not require the full weights, and the engines work remarkably steady as they are; but as we have not quite defined the point, I cannot give any further information.

The following are the weights of the parts to be balanced in these engines:

High pressure and low pressure piston head (average High pressure and low pressure piston rod and crossl)	Lbs. 234 203
Crosshead pin and two blocks		140
Connecting rod		420
Crank pin		76.9
Crank cheeks referred to crank pin		434.5
Counterbalance (one wheel)		284
Distance of centre of gravity of balance weight i	rom	

Dimensions of Hay Cars.

We have received an inquiry regarding the dimensions of hay cars. Many roads do not use such cars, but two roads which do have sent us the following information: On the Lake Shore & Michigan Southern the standard hay cars are 50,000 lbs. capacity, and hold 2,132 cubic ft.; the inside length is 33 ft. 4 in.; inside width, 8 ft. 2 in.; inside height in the clear, 7 ft. 10 in. They have one door in the middle of the car on each side, door

one door in the middle of the car on each side, door opening 5 ft. wide by 7 ft. 4 in. high. These dimensions give very good satisfaction.

On the Chicago, Burlington & Quincy the furniture cars do service as hay cars. The dimensions of the latest designs are as follows:

	Length														 					.3	9	ft.	5	16	in
r	Width	84		 																	8	64	5	16	11
	Height	44																				66			66
	FF13		-	 -	4-	a	4	20	6	M	0	31	h.	-		_		2	4-		-	La	0.00	24	+ni

with the Dunham door; the width in the clear between posts being 8 ft. 7 in. They also have end doors, 2 ft. wide × 4 ft. 1% in. long.

TECHNICAL.

Coke for Locomotives.

The Battimore & Ohio is using coke on several engines which haul their fast trains between Philadelphia and Washington. So far the results are satisfactory. The only changes made in the locomotives are to increase the opening between the grate bars about 25 per cent. and to substitute a variable for the fixed exhaust. The fireboxes are 9 ft. long and 34 in. wide. The coke is known as "24-hour coke," and is procured in West Virginia. Manufacturing and Business.

A partnership has recently been formed at Grand Rapids, Mich., under the title of Tallman & Co. by William B. Tallman, Frederick A. Gorham, Richard R. Metheany and Edgar M. Metheany. The firm proposes to manufacture the Tallman patent railroad signal

holder. The dies, tools and patterns are now being

holder. The dies, wors and parterns hade.

The Chesapeake Construction Co., of Baltimore, has been incorporated for the purpose of manufacturing mechanical and industrial appliances, construction of roadways and railroads, excavating tunnels, building gradings, bridges, etc. The capital stock of the company is \$100,000. Eben J. D. Cross, George W. Haulenbeek, Edward J. Silkman, George D. Johnston and Hugh L. Bond, Jr., are the incorporators.

The Diamond Shoal Lighthouse.

This important project was described at some length in the Raitroad Gazette, May 30, page 381. The work is extremely difficult and dangerous. The appropriation for it is \$500,000. July 1 bids were opened with the following result:

James Andrews and Gustav Lindenthal.
Sooysmith & Co.
Anderson & Barr
Theodore Cooper & Co.

The act requires that the contract must be let to the lowest bidder.

The Lindner Starting Valve for Compound Locomotives.

Locomotives.

In our issue of May 23 we announced that Mr. Charle Fairholme had taken the agency for the introduction of the Lindner apparatus for the United States, Englan and British colonies and the Continent of Europe. Captair Fairholme informs us that this agency will be in future conducted by Messrs. Hope & Co., 18 St. Dunstan Hill E. C., London, who will furnish any information concerning the apparatus.

The American Roller Makers? Assention

The American Boiler Makers' Association.

The American Boiler Makers' Association.

The third meeting of the American Boiler Manufacturers' Association began Tuesday, at the Park Avenue Hotel, New York. After the address of welcome by the President, Mr. Lappam, the Secretary read a report recommending the formation of an American boiler manufacturers' insurance company. An incomplete report on manheads and manholes was read and referred to another committee, A. H. Raynal, Chairman. A discussion on uniformity in state inspection laws regarding boilers brought out the fact that only three states have inspection laws. A committee was appointed to formulate a uniform plan of legislation on boiler inspection to be recommended to all the states.

The Desant Audible Block Signal.

The Desant Audible Block Signal.

The Desant Audible Block Signal.

The operation of the Desant Electric Co.'s audible block signal system was exhibited to a number of railroad men and others on the Suburban Elevated Railroad, New York City, last Friday. The apparatus automatically rings a bell or blows a whistle in the cab of an engine entering a block that is occupied by another train. The noise continues until the train ahead leaves the block. The signal can be used in connection with a visual block signal, and provides an additional safeguard against rear collisions. Governor Campbell, of Ohio, is President of the company, and Wm. F. C. Desant is its Vice-President. It has offices in Columbus, O., and at 45 Broadway, New York.

THE SCRAP HEAP.

Mr. P. H. Dudley with his dynagraph car is inspecting the line3 of the Cincinnati, New Orleans & Pacific.

A bridge on the Mexican National Railroad fell under a freight train on June 27th, killing three train men.

freight train on June 27th, killing three train men.
Nearly 200 men have been discharged from the shops
of the Union Pacific at Denver, and about 70 at the
South Park shops.

The managers of various Car Service Associations
throughout the country held a national convention at
Cincinnati last week. They will meet again at Buffalo
on September 4th.

The Boston & Maine has withdrawn its car mileage
accounts from the New England Clearing House, and
will, from July 1, make settlements through its own
office at Boston. Mr. George S. Hobbs has been appointed Superintendent of Car Service.

General Freight Agent Newlin, of the Fort Worth &

General Freight Agent Newlin, of the Fort Worth & Denver City, tells a reporter that claims for loss and damage are now paid by his road to consignees promptly on proof of the loss, without waiting to discover the cause or location or to apportion the bill with connecting roads.

roads.

The soliciting freight agents of the Michigan Central make monthly trips, in a body, to various cities on the line of the road, to load themselves up with information concerning traffic prospects and methods. They have just visited Buffalo, where they were shown the various railroad yards and the shipping facilities of the city.

The railroads in Massachusetts are not slow in taking advantage of the new law providing for the abolition of grade crossings. The Boston & Albany has already entered a petition for the changing of the grades at five crossings, all within a length of five miles of road and all in country districts, where land damages are presumably small.

The Chicago strike has been settled, as announced in

in country districts, where land damages are presumably small.

The Chicago strike has been settled, as announced in another column. The freight handlers at East St. Louis, remained out until July 1, the companies meanwhile securing a few men so as to do a small part of the work. A settlement was finally effected on a basis of \$1.40 per day, being ten cents less than the men asked, and 15 cents more than the former rate. Among other places from which agitations concerning wages are reported, are, Philadelphia, Indianapolis, Toledo and Columbus. Locomotive engineers gathered at Indianapolis are said to have been joined by engineers from the New York Central and other Vanderbilt roads. At Toledo the yard men of all the roads are uneasy. At Columbus, the dissatisfaction appears to be confined to the yard men of the Big Four. At Philadelphia an advance is demand ed by switchmen of the Baltimore & Ohio. A Chicago, paper says that 600 of the 800 sleeping car porters running into that city are preparing to demand higher wages. The switchmen and other employes of the Cincinnati, Hamilton & Dayton at Lima, O., struck last week, but on Thursday night the company granted the increase asked by the men.

Progress, Even on a State Railroad.

Progress, Even on a State Railroad.

Progress, Even on a State Railroad.

It would appear that the relations between the courts of Berlin and The Hague have recently undergone some improvement; for the Dutch officials at the frontier railroad station of Beest have received orders from the State Department of Railroads to inform the passengers from Germany of their arrival at the frontier by crying "Station of Beest; all change," instead of, as hitherto, by shouting "Beest; uitstigen," which may be interpreted as "Beest (or Beast) get out."—New York Tribune.

Street Railroad Statistics.

According to the Verkehrs-Zeitung there are now in Germany 70 street railroad companies operating about 756 miles of road. Of this length Berlin alone has 178 miles and Hamburg 93 miles. During the year 1888 there was carried in all 285,000,000 passengers, Berlin being credited with 126,900,000 of this number. The Verkehrs-Zeitung places the total number of street railroads in the world at 963, with a length of about 7,500 miles, and employing 193,956 horses, 17,552 mules and 435 steam engines. Of the European countries, Belgium is credited with the greatest street railroad mileage in proportion to size of country.

A Mexican "Experiment."

A Mexican "Experiment."

Engineer Way, who on March 27 last killed a Mexican, who, with three others, was trespassing on the track near Torreon, was liberated last Sunday from his enforced residence in Matamoros de Laguna. An essential preliminary to his acquittal under Mexican criminal procedure, was that Way, with the identical engine (the identical cars were also requested, but could not be forthcoming), a similar number or weight of cars, running at the same speed, should demonstrate on the spot where the accident occurred precisely how it happened in order that the judge, who was on the engine, should be able to come to a conclusion as to the guilt or innocence of the engineer. The engineer went through the movements, applying the air suddenly. The judge nearly fell off, and was abundantly satisfied that the killing was unavoidable, and says that the next time such an experiment is desired by his superior court, the superior court should make it. The result is that Way is exonerated from all blame. While at Matamoros he had the freedom of the city.—Two Republics.

Russian Railroads.

Russian Railroads.

Russian Railroads.

The Russian government is reported to be about to acquire the lines of the Southwestern Railroad, consisting of some 3,000 miles of road. This railroad commands directly and indirectly the principal outlets to the Black Sea and the strategical points on the Balkan Peninsula and the Austro-Hungarian and German frontiers, and would be important if hostilities were to break out between Russia and one of her western neighbors. The conditions of the sale are stated to be that the income shall be capitalized at the rate of five per cent., the income to be fixed by an average from the last seven years. The capital of the company is calculated to be about 300,000,000 rubles,—London Times.

LOCOMOTIVE BUILDING.

The Brooklyn Elevated Railroad Co. is having three simple locomotives changed to compounds. The work is being done at the Rhode Island Locomotive Works.

The Knox & Lincoln will probably order some nev

locomotives soon.

The Philadelphia & Reading has received ten new fast passenger locomotives, to run between Philadelphia and Jersey City. The tenders have scoops to take up water from the track tanks. These are the last engines of the 50 ordered of the Baldwin Works last fall. The 40 freight engines have been in service some time.

The trustees of the New York Locomotive Works have recently elected the following officers: President, T. H. Stryker; Vice-President, W. W. Wardwell; Secretary and Treasurer, H. M. Lawton; Executive Committee, T. H. Stryker, John W. Ellis, H. A. V. Post, Edward Comstock, W. W. Wardwell.

CAR BUILDING.

Ohio Falls Car Co. is building 25 furniture cars and 300 coal cars for the Louisville, New Albany & Chicago. They will be equipped with M. C. B. couplers.

The Riordan Refrigerating Co. is asking bids for six refrigerator cars to be completed by July 15.

The Toledo & Ohio Central has given a contract for 100 yox cars to the Ohio Falls Car Co.

The Missouri Pacific is asking bids on 500 coal cars.

It is said that the Fairbanks Canning Co. of Chicagwill build 700 more refrigerator cars.

The Ohio Falls Car Co. received two large contracts last week, one from the Central of Georgia for fifty passenger cars, two sleeping one hundred hopper, and from the Middlesborough Belt for 200 gondolas. Two trains of cars for the Atlanta & West Point were sent out June 29.

The Chicago & Eastern Illinois is asking bids on 50

DOX CARS.

The Fairbanks, Canning Co., of Chicago, has awarded a contract for building 100 cars to the Wells & French Co., of Chicago. The firm does not propose to order any other cars at present.

The Great Northern is expected to soon let contracts for about 2,000 cars ,upon which bids were asked some time ago.

The Jacksonville Southeastern is reported in the market for about 1,000 cars.

ket for about 1,000 cars.

The United States Rolling Stock Co. has received a contract for building 200 of the 1,000 cars for which the Union Pacific recently requested bids. The balance of the order was equally divided between the Michigan Car Co., of Detroit.

The Indianapolis Car & Mfg. Co. has an order from the Choctaw Coal & Railway Co. for building 200 coal cars per month until forbidden.

The Louisville, New Albany & Chicago has recently let a contract for building 300 platform cars to be used principally for hauling stone from quarries at Bedford, Ind.

The Continental Fast Freight Line has recently placed a contract for building 1,000 box cars of 60,000 lbs. capacity, equipped with air brakes and automatic couplers. They will be 34 ft. long.

matic couplers. They will be 34 ft. long.

The Chicago, Burlington & Quincy has recently put into service a new class of suburban cars. The car weighs 46,200 lbs., of which 16,000 lbs. is in the trucks. It is 50 ft. 10 in. out to out of sills and 9 ft. 2 in. wide. It seats 61 persons. The car is finished in cherry and the seats covered with cane. It is lighted with the Adams & Westlake lamp, No. 121, with acme burner, and the light is sufficient to enable one to read with perfect comfort.

Work at the Pullman Shops.

The following statement shows there are now building at the Detroit and Pullman shops of the Pullman's Palace Car Co. a total of 1,554 cars. Of these 1,493 are

being built at Pullman. The orders include at the Pullman works, 150 passenger, 29 combination and 1,314 freight and other cars; at the Detroit shops, 47 passenger, eight combination and six freight and other cars. The number of cars ordered by each company is as below: At the Pullman shops: Georgia Southern & Florida, one private car; Norfolk & Western, one private car; Interoceanic, one private and one dining car Missouri, Kansas & Texas, one private car; Denver & Rio Grande, one business, 19 first class and 10 second class passenger, nine combination baggage and express cars; Chicago, Burlington & Quincy, 12 chair cars; Baltimore & Ohio, for service on the New York & Washington line, 10 passenger, three combination passenger and baggage and four baggage cars; Central of New Jersey. three passenger, one combination passenger and baggage and one baggage cars; Illinois Central, 40 passenger and one baggage cars; Roanoke Machine Works, for service on the Norfolk & Western, four passenger and baggage, three passenger and one baggage car; Wood River Improvement Co. for service on the Kearney & Black Hills, one passenger and one combination passenger, mail and express car; Union Pacific, six chair, six excursion and six baggage cars; Pecific Short Line, four passenger and two combination passenger and baggage cars; Blackhills & Ft. Peirre, two passenger and two baggage cars; Pecos Construction & Land Co., two passenger and car; Chicago & Northern Pacific, one funeral car; Blackhills & Ft. Peirre, two passenger and two baggage cars; Delaware, cars; Cheveland & Canton, 300 gondola cars; Baltimore & Ohio, 1,000 gondola cars. At the Detroit shops: Chicago & West Michigan, six passenger, two combination baggage cars; Delaware, Lackawanna & Western, six passenger and two passenger, mail and express car; Long Island, two combination passenger, mail and express car; Long Island, two combination baggage and mail car; Philadelphia & Seashore, two first class parlor, and two second class, four baggage, 16 excursion and two co

BRIDGE BUILDING.

Beeville, Tex.—Four new iron bridges are being built at this place, and are expected to be completed early in August.

Dulin's. N. C.—The Phœnix Bridge Co. is erecting a large iron bridge on the North Carolina extension of the Norfolk & Western at Dulin's.

Laredo, Tex.—An iron bridge across the Arroya Zal-ate is reported unsafe, and it will probably be replaced by a new structure.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Central Ohio (B. & O.), 3 per cent.
Chicago, Rock Island & Pacific, quarterly, 1 per cent., payable Aug. 1.

Delaware, Lackawanna & Western, quarterly, 1% per cent., payable July 20.

Nashville, Chattanooga & St. Louis, quarterly, 1½ per cent., payable July 15.

New London & Northern, quarterly, 1½ per cent., payable July 2.

Pennsylvania & Northwestern, 2½ per cent., payable July 1.

Pennsylvania & Northwestern, 2½ per cent., payable July 1.

St. Paul & Northern Pacific, quarterly, 1½ per cent., payable July 15.

Vermont Valley, 3 per cent., payable July 1.

Worcester, Nashua & Rochester, 3 per cent., payable July 3.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Adirondack, special, adjourned, 21 Cortlandt street,
New York City, July 7.

Grafton & Greenbrier, special, Philippi, W. Va., July
18.

18.

Kentucky Union, annual, Louisville, Ky., July 21.

Memphis & Charleston, special, Memphis, Teňn,
July 9.

Missouri Pacific, special, St. Louis, Mo., July 15.

St. Louis & San Francisco, special, St. Louis, July 21,
to vote on the proposition of an increase of the common stock of the company.

Railroad and Technical Meetings.

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Meetings and conventions of railroad associations and technical societies will be held as follows:

The Association of American Railway Accounting Officers will hold its next annual meeting at the Stockton Hotel, Cape May, N. J., July 9.

The National Association of General Baggage Agents will hold its next annual convention at Chicago, Ill., July 16.

The Traveling Passenger Agents' Association will hold its next annual convention at Buffalo, N. Y., August 19.

The New England Roadmasters' Association will hold its eighth annual meeting at Boston, Mass., Aug. 20 and 21.

The National Association of General Passenger & Ticket Agents will hold its next semi-annual meeting at Denver, Col., Sept. 17.

The American Society of Ravivoad Superintendents will hold its annual meeting in New York City on the day preceeding the fall meeting of the General Time Convention. C. S. Gadsden, Charleston, S. C., is President, and C. A. Hammond, 350 Atlantic avenue, Boston, is Secretary.

The New England Railroad Club meets at its rooms in

C. A. Hammond, 350 Atlantic avenue, Boston, is Secretary.

The New England Railroad Club meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The Western Railway Club holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m. The Club has adjourned until Tuesday, Sept. 16.

The New York Railroad Club meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The Central Railway Club meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The Northwest Railroad Club meets on the first Saturday of each month in the St. Paul Union Station at 7:30 p. m.

The Northwestern Track and Bridge Association meets

day of each month in the St. Paul Union Station at 7:30 p. m. The Northwestern Track and Bridge Association meets

on the Saturday following the second Wednesday of each month at 7:30 p. m. in the director's room of the St. Paul Union station, except in the months of July

St. Paul Union station, except in the months of July and August.

The American Society of Civil Engineers holds its regular meetings on the first and third Wednesday in each month. at the House of the Society, 127 East Twenty-third street, New York.

The Boston Society of Civil Engineers holds its regular meetings at the American House, Boston, at 7:30 p. m. on the third Wednesday in each month. The next meetings at the American House, Boston, at 7:30 p. m. on the third Wednesday in September.

The Western Society of Engineers holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The Engineers' Club of St. Louis holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The Engineers' Club of Philadelphia holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia.

The Engineers' Society of Western Pennsylvania holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The Engineers' Club of Cincinnati holds its regular

a. The Engineers' Club of Cincinnati holds its regular neetings at 8 p. m. on the third Thursday of each month the Club rooms, No. 24 West Fourth street, Cinimati.

cinnati.

The Civil Engineers' Club of Cleveland holds regular meetings on the second Tuesday of each month, at 8:00 p.m.. in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the

month.

The Engineers' Club of Kansas City meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The Engineering Association of the Southwest holds regular meetings on the second Thursday evening of each month at 8 o'clock, at the Association headquarvers, Nos. 63 and 64 Baxter Court. Nashville, Tenn.

The Civil Engineers' Society of St. Paul meets at St. Paul, Minn., on the first Monday in each month.

The Montana Society of Civil Engineers meets at Helena, Mont., at 7.30 p. m., on the third Saturday in each month.

The Civil Engineers' Club of Kansas holds regular meetings on the first Wednesday in each month at Wichita, Kan.

PERSONAL.

—President Chauncey M. Depew, of the New York Central & Hudson River road, sailed for Europe this week, and expects to be absent for about two months.

—Mr. George W. Kittredge, recently Engineer of Main tenance of Way of the Pittsburgh, Cincinnati & St Louis, has been appointed Assistant Chief Engineer of the Cleveland, Cincinnati, Chicago & St. Louis.

—Mr. D. F. Jack, General Manager of the Jackson-ville, Tampa & Key West, has resigned. He has held the position about a year, and was formerly manager in Florida of the Southern Express Co. Mr. James N. Strobbar, General Traffic Agent, and Mr. A. S. Russell, Purchasing Agent, have also resigned.

—Mr. Bartholomew Murtaugh, Roadmaster of the Eastern Division of the Central of New Jersey, who recently tendered his resignation, after a service with the company of 18 years, was last week presented with a handsome gold watch and chain, a gift from the employés, with whom he is very popular. He also received a purse of money.

-Mr. Francis C. Yarnall. Vice-President of the Lehigh Coal & Navigation Co., died at his home at Overbrook, Pa., June 25, at the age of 61 years. Mr. Yarnall was President of several of the Lehigh Valley branch lines. He was one of the directors of the road, and after the retirement of E. W. Clark, four years ago, he was Acting President until the election of Mr. Wilbur.

—Mr. Edward Dickinson, formerly General Manager of the Union Pacific, has been appointed General Superintendent of the trans-Ohio divisions of the Baltimore & Ohio, with headquarters in Chicago, to fill the vacancy caused by the resignation of Mr. W. Peabody several months ago. Capt. Peabody is now Vice-President of the Baltimore & Ohio Southwestern.

of the Baltimore & Ohio Southwestern.

—Mr. A. W. Street, who was fined \$3,000 at Chicago last week for violation of the Interstate Commerce law, is now Commercial Agent of the Missouri Pacific at Kansas City. Western newspapers say that Mr. Street made the reduced rate by the advice and consent of his superiors, but that the road now turns the cold shoulder upon him; and that he is poor and unable to pay the fine, but is receiving offers of help from his friends. His wife is said to have lost her reason on account of his trouble.

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—John W. Johnston, Third Vice-President of the Richmond & Danville, has resigned that position on account of ill health and the pressure of private business. Mr. Johnston was President of the Georgia Pacific when that road was leased to the Richmond & Danville last year. He was then elected Fourth Vice-President of the latter company and in January last Third Vice-President. He has been President of several other railroad companies and also Vice-President and General Manager of the Richmond & Danville Extension Co.

Manager of the Richmond & Danville Extension Co.

—Mr. Austin Corbin has resigned from the Presidency of the Philadelphia & Reading, and Mr. A. A. McLeod, Vice-President of the company, has been elected his successor. As the President of the Philadelphia & Reading Railroad cannot be a member of the Board of Managers, Mr. McLeod has resigned from that body, and he has been succeeded by Col. James Boyd, of Norris town, one of the attorneys of the company. It is believed that Mr. Corbin will be elected to the Board of Managers upon his return from his present European trip.

ELECTONS AND APPOINTMENTS.

Atlanta & Birmingham,—B. H. Walker, Walker Daw on and E. M. Blalock, of Atlanta, are the contractors.

Baltimore & Ohio.—E. Dickinson has been appointed General Superintendent of the lines west of the Ohio River, with headquarters in Chicago.

Boston & Maine.—George S. Hobbs has been appointed uperintendent of Car Service and placed in charge of the car mileage accounts of this road and its leased lines.

Chesapeake & Ohio.—Charles Buetgenbach has been appointed Southern Passenger Agent at Louisville, Ky. vice Jay F. Durham, resigned.

Chirago, Milwauker & St. Paul.—Joseph F. Tucker, Assistant General Manager, has been appointed sistent to the President, and the former office has abolished.

Cleveland, Cincinnati, Chicago & St. Louis.—Joseph H. Garaghty, Purchasing Agent of the Columbus, Hocking Valley & Toledo road, has been appointed Purchasing Agent of the road, with headquarters at Indianapolis. He succeeds Edward Hill, resigned.

Dayton & Michigan.—The following officers were re-cently elected: Thomas J. Emery, President; J. J. Emery, Vice-President; F. H. Short, Secretary and Treasurer.

Evansville & Terre Haute.—F. S. Dodds has been apointed Division Superintendent. Mr. Dodds was formly Chief Train Dispatcher of the South & North Alama Division of the Louisville & Nashville road.

Kansos City, Ft. Scott & Memphis.—It is announced that Daniel Bonticou, of the firm of Knight & Bonticou, of Kansas City, Mo., has been appointed Chief Engineer of the road.

Louisville, Evan-ville & St. Louis.—George K. Lowell has been appointed Superintendent of Transportation, with headquarters at Huntingburg, Ind. S.S. Woodard has been appointed Chief Train Dispatcher, vice H. E. Craft, who has been promoted to be Master of Trains. The headquarters of both are at Huntingburg, Ind.

Los Angeles, Pasadena & Glendale.—Thomas B. Burett has been appointed General Manager, and the ffices of Secretary, Treasurer and Superintendent have een abolished.

Mexican Northern.—Robert S. Towne and August S. Meyer, of Kansas City, Ido.; Nathaniel Witherell, of New York City; Edward M. Shepard, of Brooklyn, N. Y.; A. Foster Higgins, of Greenwich, Conn., and Charles J. Nourse and Nelson S. Spencer, of New York, are the first directors of this company chartered in New York

New York, Ontario & Western...A. C. Caryl has been appointed Assistant Superintendent of the Ontario, Carbondale & Scranton division.

Northern Pucific.—Newman Kline has been appointed Assistant to the General Manager, and will have charge of the General Manager's office, with such duties as may be assigned to him. Countersignature of passes and requests for the same will be charge of Mr. Kline. F. W. Wilsey has been appointed Right of Way and Lease Agent for this company's lines.

Paris, Marshall & Sabine Pass.—The directors re-elected at the annual meeting of the road at Dallas, Tex., June 25, are: D. H. Scott, John Martin, Paris, Tex.; R. D. Hairslip, New York; J. S. Gross, Dallas, Tex.; A. Gilmer, Beaumont, Tex.; W. Fletcher, Orange, Tex.; E. J. Fry, Marshall, Tex.

J. Fry, Marshall, Tex.

Philadelphia & Reading.—Austin Corbin having resigned as President, A. A. McLeod, Vice-President, succeeds. Col. James Boyd, of Norristown, Pa., has been elected a member of the Board of Directors to succeed Mr. McLeod.

George C. Shonton has been appointed Traveling Freight Agent, with office at Reading, in place of R. R. Gordon, who has been assigned to other duties.

Port Orchard & Southwestern.—The incorporators of this company are: Thomas B. Sweany, William G. Gosslin, John Leo, Herbert L. Jenkins, Owen Young, Thomas A. Dougherty, Arthur N. Jordan and James Wichersham.

Rio Grande Western.—A. E. Welby, Chief Clerk to the General Manager of the Denver & Rio Grande, has been appointed General Superintendent to succeed W. H. Bancroft, resigned. Mr. Welby will be succeeded by H. P. Pike, who has been Secretary to Mr. Smith.

Toledo, St. Louis & Kansas City.—E. L. Harper, formerly Chief Engineer of the St. Louis & Peoria, has been appointed Assistant Engineer of the road, vice E. M. Culp, resigned. His headquarters will be in Toledo.

Trout Run,—The officers of this Pennsylvania company are: President, W. L. Torbert; Chief Engineer and General Manager, T. E. Titman; Treasurer, J. M. Titman; Secretary and Assistant Superintendent, J. F. Finney; Passenger and Freight Agent, O. A. Keim, and Master Mechanic, George Dickson. The office of the company is at Cammal, Pa.

is at Cammal, Pa.

Union Pacific.—The following changes have recently been made: J. V. Parker, recently Assistant General Freight and Passenger Agent of the Mountain Division at Salt Lake City, Utah, has been appointed General Freight Agent, with headquarters at Kansas City, Mo. Superintedent Palmer, of the Western Division of the Kansas Pacific line, succeeds J. O. Brinkerhoff as General Superintendent.

John W. Griffiths, late Auditor of Disbursements, has been appointed to the position of General Purchasing Agent. Fred. B. Whitley is appointed General Freight Agent, and J. S. Tebbetts Superintendent of the coal department.

Winona & Southwestern.—C. A. Bartlett has been appointed Division Engineer, and will have charge of construction of the first division from Utica southwest with headquarters at Dover.

RAILROAD CONSTRUCTON. Incorporations, Surveys, Etc.

Anniston & Atlantic.—Aldrich, Worthington & Co., of Birmingham, Ala., have received the contract for grading the last 11 miles of the extension from Sylacaugua to Calera, Ala., a total distance of about 33 miles. McDonald & Campbell, of Anniston, Ala., who have the contract for the first 22 miles from Sylacaugua, have the grading completed on about three miles, and work is progressing on the rest of the section.

Atlanta & Birmingham.—This company has applied for a charter in Georgia for a road to extend through the counties of Fulton, Campbell, Coweta and Heard, to form part of a new line between the two cities mentioned in the title. The present capital stock of this company is \$200,000.

Atlantic, Mexican & Pacific.—Under this title some hopeful enthusiasts have incorporated in Illinois a divi-sion of a road which they call a new transcontinental line to the Pacific at Mazatlan, Mexico. The Illinois

charter describes a road from a point on the Wabash River, at Merom, in Crawford County, to East St. Louis; also a branch, beginning in Crawford County, to Ches-ter. The capital stock is \$5,600,000, and the headquarters are given at Robinson, Ill.

are given at Robinson, Ill.

Baltimore Belt.—The company has invited proposals for the graduation, masonry and tunneling of the road. The bids are to be upon the entire work or upon sections, of which there are to be four. The first section is to be two miles long, from Bay View Junction to Belair road, the second from Belair road to Guilford avenue, 1½ miles; the third from Guilford avenue to a point near Mt. Royal avenue, 1½ miles, and the fourth from Mt. Royal avenue to Hamburg street. The Maryland Constructing the tunnel, but the plan was changed, and it was determined to give the work out to contractors. The road will probably be completed in two years. Samuel Rea is Chief Engineer.

Birmingham Mineral.—J. D. Myer, who has the con-

is Chief Engineer.

Birmingham Mineral.—J. D. Myer, who has the contract for grading the Tuscaloosa extension from the present terminus at Milldale, Ala., northwesterly, a distance of six miles, to a point within 17 miles of Tuscaloosa, has completed this work. Tracklaying will probably begin shortly on this section, but it is not likely that the line will be extended any further at present.

Brieffield, Blockton & Birmingham.—It is stated that about 2,000 men are working on the Bessemer branch from a point near Gurnee to Bessemer, Ala., 20 miles. The grading is very heavy, and it is not expected they will have the line ready for operation for some months. The portion between Montevallo and Blockton, Ala., 34 miles, is being operated.

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Calgary & Edmonton.—The material for building the first division of this road from Calgary, Alberta, on the Canadian Pacific, has been ordered. Work has been commenced at Calgary. The surveys have been nearly completed for the entire line from Calgary north to Edmonton, about 200 miles, and sout's 100 miles, toward the International boundary near MacLeod. The funds have been obtained for building the entire road. It will be operated by the Canadian Pacific as soon as it is completed. It is expected to have 250 miles in operation next year and the balance in the following year. The contract for building the entire line, including tracklaying, stations and other buildings, etc., has been let to James Ross, Windsor Hotel, Montreal.

Chattanooga Southern.—Dunn Bros., and R. T.

Characteristics of grading has been completed on the road in Georgia and ten miles of the awarded the contract for the grading of 30 miles of heavy work on this line in Alabama, near Gadsden. The contract for 10 miles, including a tunnel 1,400 ft. long, has been let to T. B. Redmond, of Chattanooga, and another section of 15 miles of grading has also been awarded. About 20 miles of tracklaying has been completed on the road in Georgia and ten miles on the Gadsden end.

Cleveland Belt.—The Cleveland & Canton, which proposes to build this belt at Cleveland, O., has recently but a number of engineers in the field on the survey. It is not likely, however, that any further steps will be taken at present to begin construction work on the line.

taken at present to begin construction work on the line.

Coos Bay, Roseburg & Eastern.—This company has been organized in Oregon recently to build a road in the southern part of the state from Marshfield, on Coos Bay, easterly, a distance of about 50 miles, to Roseburg. The Oregon Improvement Co. proposes to build a road practically over the same route as the above and several other companies have been recently organized to build lines between much the same points. A subsidy of \$150,000 has been raised in Marshfield and Roseburg in aid of the project. The road, if built, will reach an extensive timber district and an agricultural country, which at present has practically no railroad facilities.

Decatus, Chespanake & Now Orleans — LT. Cross.

Decatur, Chesapenke & New Orleans.—J. T. Crass, of Decatur, Ala., will soon sublet about 30 miles of grading and trestling on this road, mostly earthwork, between Decatur and Fayetteville, Tenn.

Duluth & Winnipeg.—Tracklaying will commence this week near La Prairie, Minn., on the division between that point and Lake Winnibigoshish. The grading has been completed on about 35 miles of the division between La Prairie and Red Lake. The survey has been made for the entire line to the international boundary at the Lake of the Woods, a distance of about 150 miles Donald Grant & Co. and Foley Bros. are the contractors.

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Fairhaven & Southern.—The contract for building about f0 miles of the line between Sedro and Spokane Falls, Wash., will probably be soon sublet. The locating survey has been made for this distance, and about five miles of the line has been graded. The company is at present constructing lines from Fairhaven, Wash., north to New Westminster, B. C., about 50 miles; from Sedro easterly up the Skagit River, a distance of 20 miles, and from Sedro southward in the direction of Seattle for about 50 miles. It is proposed to continue the line eastward through the Okanogan country toward Spokane Falls and also south toward Tacoma. Most of the work that has been already done has been built by the company's forces, but the sections not yet placed under construction will probably be awarded in small sections to contractors. There is no construction company. Nelson Bennett, of Tacoma, is President.

Fincastle & Troutville,—The Fincastle & Southern

Bennett, of Tacoma, is President.

Fincastle & Troutville,...The Fincastle & Southern Botetourt Development Co., which proposes to bu ld this short Virginia road, is at present securing the right of way. The preliminary survey was completed son e time ago. The road is to extend from Fincastle, the county seat of Botetourt County, to Troutville, a station on the Shenandoah Valley road, about 11 miles east of Roanoke. The distance is about seven miles. The route is through a hilly country, but the construction will be mostly light work, the road being built with a maximum grade of 2.8 per cent. and a maximum curvature of 20 degrees. The estimated cost of the construction of the line is about \$\$0,000. William B. Simmons, of Fincastle, is President, and Edmund Grover, of Iron Gate, Va., is Chief Engineer.

Gate, Va., is Chief Engineer.

Fitchburg.—The tracks of this road are being connected with those of the New York Central & Hudson River road, near Rotterdam Junctior, N. V. which is the western terminus of the Fitchburg main line. Thacks of the West Shore and Fitchburg have long been connected at this point, this having been an important junction before the West Shore based under control of the New York Central. The Fitchburg and the West Shore were then joint competitors for through lusiness as against the Boston & Albany and New York Central.

Georgia, Tennessee & Illinois.—The first 37 miles of this road from Tallapoosa, Ga., to Rock Run, Ala., has been surveyed and the preliminary line is being con-

tinued from this point to Fort Payne and Stevenson, Ala., on the Tennessee River, a distance of 115 miles from Tallapoosa. A second corps of engineers will probably take the field immediately to run a line from Stevenson southerly and connect with the survey now being made from Tallapoosa. It is also intended to begin the locating survey in a few weeks. When this has been finished the contracts for grading and tracklaying will probably be awarded.

Herkimer, Newport & Poland.—Some New York parties have offered to purchase, at 50 cents on the dollar, 60 per cent. of the capital stock of the company, which amounts to about \$170,000, at par value. If the syndicate is successful in its negotiations it proposes to change the line from 3 ft. 6 in. gauge to standard gauge, and to extend the road from Poland to Jock's Lake, in the North woods, where a large tract of land has been purchased. The road at present extends from Herkimer, northward to Poland, N. Y., 17 miles.

Indianapolis & Northwestern.—The charter of this company was filed in Indiana this week by officers of the Lake Eric & Western, of which it will be a branch. The road is to extend from Indianapolis, on the Michigan City division, northwesterly to Muncie, Ind., giving the company a shorter route to Indianapolis than over the present line through Tipton. The capital stock is \$100,000.

the present line through Tipton. The capital stock is \$100,000.

Kansas City Link.—The locating survey is now in progress for this line, which was formerly called the Kansas City Connecting. The road will be about 27 miles long, and will extend from the town of Quindaro, on the Missouri River, southerly to the Kansas River, between Argentine and Armourdale, thence through Rosedale, and easterly along the valley of the Brush Creek to the Blue River, and north along that valley, through Manchester and Centropolis, to the bridge of the Chicago, Milwaukee & St. Paul, which crosses the Missouri River near Randolph. It is proposed to continue the line westerly from this point on the north side of the Missouri River to the starting point at Quindaro. This section, however, will not be commenced until the other portion of the line has been completed. There will be several bridges, the largest of which will be at the crossing of the Kansas River. This will have four spans 200 ft. long, with two 30-ft. girders. The structure across the Blue River will be about 100 ft. long. There will be a tunnel 500 ft. long south of the Kansas River and between Armourdale and Rosedale. William B. Knight, of Kansas City, Mo., is Chief Engineer.

Little Wabash.—This company has been incorporated in Illinois to build a road between Effingham and Carmi. The capital stock is \$1,500,000. The principal office is at Clay City, Ill.

Maricopa & Phœnix.—Senator Jones of Arkansas has introduced a bill in the United States Senate to authorize the Supervisors of Maricopa County, Ariz., to issue bonds at the rate of \$4,000 a mile in aid of the construction of a road from Phœnix to the northern boundary of the county. Tis bill is intended to take the place of the bill recently vetoed by the President.

boundary of the county. Tis bill is intended to take the place of the bill recently vetoed by the President.

Marietta & North Georgia.—Work on the Knoxville Southern, the Knoxville extension of this road, has been progressing very rapidly during the last few months. A considerable part of the grading was done last year. Nearly all the tracklaying has been completed this year, 85 miles having been laid since Jan I. The Richmond & Danville rail, 60½ lbs. to the yard, is used. The tracklaying is being done with two Harris tracklayers, and the construction force has often laid over two miles of track per day. The only section not now finished is a piece of road about 10 miles long on the Hiawassee River, in Tennessee. This comprises the heaviest work on the line. The route is through a mountainous country, and much of the work has been very heavy. The road connects with the Marietta & North Georgia at Blue Ridge, Ga., and extends north through eastern Tennessee to Knoxville, about 120 miles. Through trains will probably be put on between Knoxville and Atlanta, about 227 miles. The tracks of the Western & Atlantic will be used between Marietta and Atlanta, about 227 miles. The tracks of the Western & Atlantic will be used between Marietta and Atlanta, about 22 miles. At Knoxville the road will use the same station as the Knoxville, Cumberland Gap & Louisville, and it will be operated in close connection with that line, giving practically a continuous route between Atlanta and the coal fields near Cumberland Gap, 300 miles long. The Knoxville Southern and Marietta & North Georgia traverse the heart of the famous marble district of northwest Georgia and eastern, Tennessee along the Hiawassee River. Other minerals are also abundant along the lines. The Richmond & Danville will soon have in operation an extension of its western North Carolina division to Murphy, N. C., the northern terminus of the Company were filed in the office of the Secretary of State,

Mexican Northern.—Articles of association of the company were filed in the office of the Secretary of State, at Albany, N. Y., June 26. It is proposed to construct a road from a point on the Mexican Central, within 15 miles of Escalon, northerly, to the district of Sierra Mojada, and also to operate a line of steamers to smelters to be erected under a government concession of Leigh H. Rouzer and Robert S. Towne.

Leigh H. Rouzer and Robert S. Towne.

Mexican Southern.—The whole of the masonry and earthworks on the first division of 78 miles from Puebla is completed and tracklaying is being finished very rapidly. The contractors anticipate very rapid work on this division. On the second division from Tehuacan to Tecomavaca, 60 miles, the earthworks are three-fourths completed and a great deal of the masonry is done. Nearly the whole of the material for this portion of the road has been received from England, but the contractors have been considerably delayed by reason of its not having been dispatched sooner. Read & Campbell, of Puebla, are the contractors.

of Puebla, are the contractors.

Michigan Central.—It has already been noted that this company proposes to complete a second track on about 53 miles of its Canadian division this year. The grading for about 15 miles of this work will be done by the company's own men, but the balance will soon be awarded to contractors. The company has already completed this year and placed in operation about 23 miles of second track. This is between Grass Lake and Dexter, Mich., 18½ miles, and between Maidstone and Essex Centre, Ont., four miles.

present terminus, to Huntsville, Ala., or to some other point on the Huntsville branch. The stockholders also voted to extend the Jasper branch from Dunlap to Pikeville, Tenn. 20 miles. To provide funds for this work it was decided to issue first-mortgage consolidated five per cent. bonds on the several lines. It is estimated that the work decided upon will entail an expenditure of about \$1,730,000.

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A party of engineers, under charge of T. P. Branch, commenced this week the survey for the proposed extension of the Tennessee & Coosa road from Attalla northeasterly across the Tennessee River and toward Huntsville, a distance of 60 miles.

Newfoundland.—The following conditions are contained in the contract of Middleton & Reid for the construction of the Government road from St. John s to Hall's Bay. The line will be laid and equipped for \$15,600 per mile, the distance being 272 miles; the payments will be made in annual instalments, either in cash or in bonds, at three and a half per cent.. at the option of the Government. The time occupied in building the line will be five years, at the rate of 54 miles per year; the security, giving assurance that the contract will be performed, amounts to \$250,000, and this amount has been deposited.

New Roads.—A convention of delegates from the coast counties of California interested in the completion of a road along the coast from San Francisco to Los Angeles met at San Jose, Cal., June 26, and adopted resolutions pledging its members to secure rights of way, depot grounds, and to subscribe for \$50,000 of the first mortgage bonds of the company when organized on the condition that the Southern Pacific resume active work on the gap of 172 miles between Santa Margarita and Ellwood.

Some New York parties have subscribed \$60,000 to build a road from Montclair, on the Delaware, Lackawanna & Western, to Cedar Grove, N. J., on the New York & Greenwood Lake road, a distance of four miles. The surveys for the line have been made. When completed the New York, Lake Erie & Western will, it is expected, operate the line.

Ground was broken this week for a new road from Caldwell to Cedar Grove, N. J., to connect with the New York & Greenwood Lake Raiiroad, which extends to New York & Greenwood Lake Raiiroad, which extends to New York & Greenwood Lake Raiiroad, which extends to New York, via Newark. The length of the proposed road is between three and four miles. It will probably be ready for use by the autumn.

New York, Lake Erie & Western.—Surveys, for the

New York, Lake Erie & Western.—Surveys for the continuation of the second track of the Northern, of New Jersey, from Creskill to Piermont, N. Y., are being made and tracklaying will soon begin. When this work has been completed the road will be double tracked 25 miles. The stone ballasting of the line is progressing steadily.

New York, Ontario & Western.—The Ontario, Carbondale & Scranton was opened for traffic July 1 by the running of regular coal trains between the company's mines at Carbondale, Pa., and the New York, Ontario & Western main line at Hancock Junction, N. Y. The line will be operated as a third division of the Ontario & Western system. Passenger and freight trains will begin running regularly over the new road on July 14. The station houses will then have been finished and the ballasting of the track completed. Two passenger trains will be run each way daily between Hancock Junction and Scranton. These trains will connect at Hancock Junction with express trains on the Ontario & Western main line going north and south, and at Scranton with express trains for New York over the Central of New Jersey, and Delaware, Lackawanna & Western. The new road is 54.37 miles in length. The Delaware River bridge, near Hancock Junction, is 648 ft. long. and 68 ft. above low water mark.

bridge, near Hancock Junction, is 648 ft. long. and 68 ft. above low water mark.

Northern Pacific.—It is reported that about 1,100 men are working along the Tacoma, Olympia & Gray's Harbor line at various points between Centralia and Gray's Harbor, Wash. When work has been commenced on the division between Centralia and Shoalwater Harbor this force will be greatly increased. The work being done at present is largely at Centralia, where a long trestle is being built across the Skookumchuck River. This is a Howe truss bridge built on foundations of piles. Several carloads of rails have arrived at Centralia, and tracklaying is now in progress. It is expected to have 20 miles completed by July 10. Mathews & Kirch, of Butte, Mont., have the contract for tracklaying on the entire division to Gray's Harbor, and Griggs & Heustis have the contract for grading on both lines, as already stated. Henry & Balch, of Minneapolis, have been awarded a contract for building about 20 miles of the road at Lake Washington, near Seattle, which is to form part of the proposed belt line around the lake, to be operated by the Northern Pacific and the Seattle, Lake Shore & Eastern. The entire line will be about 60 miles long, 40 miles of which will be owned by the Seattle, Lake Shore & Eastern. This latter section has already been completed and is being operated by the latter company as part of its road. It is expected that the section just placed under contract will be ready for operation during the latter part of the year.

The Norris & Pony branch has been completed and placed in contriction.

The Norris & Pony branch has been completed an placed in operation. It extends from Sappington southerly through Harrison toNorris and Pony, Mont., a distance of about 28 miles.

Oregon Improvement Co...It is stated that the company has decided to begin work very soon on a road in Southern Oregon from Empire City on Coos Bay south to the Coquille River, a distance of 10 miles. The locating surveys have been made and the contracts will soon be awarded. The lines will probably be continued through the Coquille River Valley to a connection with the Southern Pacific's Oregon line near Roseburg, Or.

Or.

Paducah, Tennessee & Alabama.—About 500 men are working on this line between Paducah, Ky., and Paris, Tenn., and it is expected to have the tracklaying completed by October 1 on 50 miles of the distance between these points. The locating surveys have been made for 100 miles from Paducah towards Florence, Ala. The grading on this 100 miles is very light, and there are few bridges. The maximum grade is about one-half of 1 per cent. Johnson Bros. & Faught, of Paducah, have the contract for grading, and have sublet some of the work. It is stated that the financial arrangements for building the section located have been completed by a syndicate, which is represented by T. J. Moss, of St. Louis. N. R. Olcott, of Paducah, is Chief Engineer.

Pecos Valley.—W. C. Bradbury & Co., of Denver,

Nashville, Chattanooga & St. Louis.—At a special meeting of stockholders in Nashville, Tenn., June 26, the purchase of the Tennessee & Coosa was ratified and it was also voted to extend the line from Attalla, its

gress from this point, and already about 13 miles have been finished and the tracklaying begun.

Philadelphia & Reading.—It is reported that the company will soon begin a survey for a branch about 10 miles long from Langhorne through Holmesville and Newportville to Bristol, a distance of about 10 miles.

Newportville to Bristol, a distance of about 10 miles.

Phillips & Rangely.—A dispatch from Phillips, Me., states that about 600 men are now working on this road between Phillips and Rangely, a distance of about 1,000 men within a few days, and the road will probably be in operation in the latter part of September. About one mile of grading has been completed from the Sandy River, and the piers for the bridge have been about finished. The road will be of 2 ft. gauge and it will connect Phillips with the Sandy River road, also of 2 ft. gauge, but it will be operated separately from that line.

Port Orchard & Southwestern.—This company has

gauge, but it will be operated separately from that line.

Port Orchard & Southwestern.—This company has been recently chartered in Washington for the purpose of constructing a road from Port Orchard Bay southwesterly through Allyn and to a connection with the Port Townsend Southern and Tacoma, Olympia & Gray's Harbor roads, now under construction, in township 20 north, range 5 west. A road already completed for about half the distance between Port Orchard Bay and Allyn will probably be merged with this line and form part of the contemplated road. The distance between Hood's Canal and Port Orchard Bay, opposite Seattle, is about six miles. The survey of the line is to begin very soon. The capital stock is \$400,000.

Pueblo & Eastern.—This company proposes to

Pueblo & Eastern.—This company proposes to build a road between Pueblo, Colo., and Dodge City, Kan., connecting at both places with the Chicago, Rock Island & Pacific. It will cross the Arkansas River at Rocky Ford.

Rocky Ford.

Qu'Appelle, Long Lake & Saskatchewan.—The grading has been completed from Saskatoon to within five miles of Regina. The track has been laid for a distance of about 180 miles from Qu'Appelle, the Southern terminus. This leaves 80 miles of tracklaying yet to be completed to ireach Prince Albert, the northern terminus. It is expected to have the grading on the 250 miles completed some time in August, and to have the line ready for operation in October.

line ready for operation in October.

San Antonio & Aransas Pass.—The company has notified the bondholders of the main line that default will be made in the payment of the semi-annual interest due this month. The company states that the maturing of construction claims for the extensions and branches recently built, and the delay in negotiating the sale of first mortgage bonds on these lines is the principal cause of the default. The company has completed a considerable amount of grading on a number of lines which it has not yet finished, and in some cases much tracklaying has been done. The most important is the line from West Point north to Waco, which is in operation to Lockhart, about 15 miles north of West Point.

Savannah. Americus & Montgomery.—The roadbed.

Savannah, Americus & Montgomery.—The roadbed, trestles and cuts of the entire line between Americus and Louvale, Ga., have been changed to standard gauge and the rails are now being laid at the rate of over a mile a day. Through standard gauge trains will probably be running between Columbus and Savannah over this line in connection with the Central of Georgia by July 20. Trains will also probably be running by August 20 on that part of the Montgomery extension which lies in Georgia—that is, between Louvale and the Chattahoochie River. in Georgia—the hoochie River.

Scattle & Montana... The contract for building the first 70 miles of this road, which is the Pacific coast extension of the Great Northern, will probably be let within three weeks. The preliminary survey has been made from Seattle to the Cascade Mountains, and the locating survey is now in progress between these points and has been completed for some distance. The contract for building the line will probably be awarded to Shepard, Siems & Co., of St. Paul.

Sierra Mojada.—This Mexican road is to extend from Jimenez, a station on the Mexican Central, to Sierra Mojada, and to Barroteran on the International, with a branch from Hermanas, crossing the International to Lampazos, to connect with the Mexican National. The whole length is about 360 miles and the construction is now in progress on the first part of the line. Samuel Lederer is the representative in the City of Mexico.

Somerset.—The extension from the present northern terminus at Solon, north to Bingham, Me., at the forks of the Kennebec River, a distance of about eight miles, was completed last week, and the line will probably be placed in operation early in July.

Southern Pacific.—The company states that grading will probably be commenced within a few days on the extension of the Stockton division from the present southerly terminus at Oakdale, thence south through Waterford, Snelling and Hopeton, to Merced, a distance of about 40 miles. Merced is on the main line of the Southern Pacific. All the surveys have been completed, and nothing now hinders the work. The Pacific Improvement Co, has the contract for the grading and tracklaying, and it hopes to complete the line before the heavy rains.

Toledo, Columbus & Cincinnati.—The company will probably determine upon the route for its southern extension from Kenton some time this month, and the contracts for grading and tracklaying will probably then be given out. As may be remembered, two surveys were made last year between Kenton and Marysville, the more westerly passing through West Mansfield, and the other through Byhalia. It will depend upon the ease of securing right of way which of these lines will be adopted, as they differ very little in grading and length.

length.

Toledo & Michigan Belt.—About three-fourths of the grading of this belt line at Toledo has been completed. The total length of the line will be 3.4 miles. It is being built by the Michigan Central, and will extend from a connection with the Toledo division of that road, near Detroit and Prairie avenues, to a connection with the Wheeling & Lake Erie at Columbus street, in North Toledo. There will be three trestles on the line, 1,981 tt., 886 ft. and 248 ft. long respectively. The work is generally light. The maximum grade is less than one foot per mile, and the maximum curvature is a little over seven degrees. Bick & Glenn, of Toledo, are the contractors for the grading, and M. Steiner, of Detroit, Mich., has the contract for the trestle work.

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Clinton County, Pa., on the Philadelphia & Erie. The distance is about 22 miles, including branches. The line will probably be extended to Tioga County. The principal freight tonnage comprises timber, lumber, bark-coal, glass sand, building stone and farm produce. There is one trestle 120 ft. high and 200 ft. long, and one three-span bridge, 380 ft. long. There are several minor structures. The road rises the mountain with a grade of 488 ft. to the mile. W. L. Torbett, Grand Manor, Pa., is President.

Union Pacific.—Hale & Smith, of Portland, Or., have been awarded the contract for grading part of the Portland & Puget Sound extension, between Olympia and Tacoma, Wash.

and Tacoma, Wash.

Union Transfer Co.—It is stated that nine of the roads entering Chicago have each subscribed for \$50,000 at par of the capital stock of this company, which proposes to build a very extensive system of transfer yards near Chicago, and establish a freight clearing house. It is a scheme proposed by A. B. Stickney. The company expects to secure subscriptions of \$50,000 from II other roads, which reach Chicago. The following are the roads which it is reported have already subscribed: Chicago, St. Paul & Kansas City; Chicago, Rock Island & Pacific: Chicago, Milwaukee & St. Paul; Chicago & Eastern Illinois; Atchison, Topeka & Santa Fe; Baltimore & Ohio; Pennsylvania; Chicago & Northwestern, and Chicago, Burlington & Quincy.

Western Maryland.—The Western Maryland Tide-

nois; Atchison, Topeka & Santa Fe; Baltimore & Ohio; Pennsylvania; Chicago & Northwestern, and Chicago, Burlington & Quincy.

Western Maryland.—The Western Maryland Tidewater Co. will issue \$4,000,000 first mortgage 50 year five per cent. bonds, \$1,200,000 of the proceeds to be applied to the purchase of the stock of the Pennsylvania lines to be built under the charter of the Baltimore & Harrisburg Railroad Co.'s "Eastern extension" from Porter's Station via York to Chickies, with a branch from Thomasville to Bowmansdale; \$400,000 to the purchase of the stock of the Potomac Valley on the main line extension from Williamsport, Md., to a connection with the Baltimore & Ohio at Cherry Run; \$1,500,000, or as much as may be necessary, to the construction of its own line through the city of Baltimore to tidewater; the balauce, after paying interest during construction and meeting contingent expenses, to be held as a reserve fund or invested in terminal property and new equipment to be held in the name of the Tidewater Company. The Western Maryland will lease the Tidewater Company, and will enter into a traffic contract with each of the proposed lines, paying a rental equal to five per cent, upon the outstanding bonds of the Tidewater Company, and will enter into a traffic contract with each of the proposed new lines to supply to it passenger and freight traffic in sufficient amounts to enable it to earn the necessary amount to pay its expenses of every character and five per cent, upon cost, either as a dividend upon stock or interest upon bonds. In the official statement issued in relation to the bonds the proposed lines are described in some detail. The branch line, from the Baltimore & Harrisburg through York to a connection with the Philadelphia & Reading, at Chickies, will be 29 miles long; the other lines are 20 miles from Thomasville, upon the Proposed York & Chickies line, to Bowmansdale, upon the Harrisburg. The latter company is now bridging the Susquehanna River and completing, in the name of the Harrisbur

ous important points in aMryland and Pennsylvania.

Wheeling & Lake Erie,—The proposition to have a subscription of \$100,000 raised in Wheeling, W. Va., for an extension to that point has not succeeded, subscriptions only being received for the amount of \$25,000. The effort to obtain further subscriptions has been abandoned. The company may submit another proposition asking the county to subscribe for \$100,000 of the common stock of the road, payable in county bonds. The company proposes to build to Martin's Ferry, O., opposite Wheeling, on the north side of the Ohio River, and to use the terminals of the Wheeling Bridge & Terminal system for an entrance to Wheeling.

winnipeg & Hudson Bay.—The company has been informed that upon its producing satisfactory evidence of ability to construct and operate 300 miles of the proposed road from Winnipeg to Saskatchewan River at or near High Falls, the Dominion Government will ask Parliament to grant the company the same aid as that given to the Calgary & Edmonton during the last session. This portion of the road is considered as being a colonization line, which will open up a fertile portion of Manitoba and the Northwest territories.

of Manitoba and the Northwest territories.

Winona & Southwestern.—Dennis Galligan, of Winona, Minn., has secured the contract for the 22-mile section from Dover, Minn., southwesterly to Stewart-ville. As already stated, he already has the contract for II miles between Utica and Dover, having about 250 men and 100 teams at work on this contract. He will soon put a large force on the second contract southwest from Dover. The right of way is being secured for a further extension of the line from the end of the present contract through Mower County to the Iowa state line, and toward Osage, Ia., a distance of about 50 miles. As soon as the right of way has been secured for this distance the contract for grading will probably be awarded. The contract for building the bridges and trestles on 32 miles of the road from Utica west to Dover, and thence southwesterly, has been awarded to D. A. Leary & Son, of St. Paul, who have already begun work.

Dennis Galligan, of Winona, Minn., has secured the contract for the 22-mile section from Dover.

Woonsocket & Pascoag.—The grading on this road was commenced at Nasonville, R. I., last week. The line will be built from Pascoag to Woonsocket, R. I., a distance of 12 miles. The cross ties and rails and other material have been ordered, and will be delivered in August. It is expected that the road will be put in operation some time in the fall.

Gross Earn.	Op. Exp.	Net Earn.	Op. Mil.
	\$1,987,595	\$863,100	6,258
155,024	122,704	32,319	582
\$3,005,718	\$2,110,299	\$895,419	7,110
\$543,617	\$354,157	\$189,460	1,329
152,067	118,841	33,225	526
\$695,684	\$472,908	\$222,685	1,85
83 701 402	92 583 298	81 118 104	8,96
	\$2,850,695 155,024 \$3,005,718 5: \$543,617 152,067 \$695,684	Earn. Exp. \$2,850,695 \$1,987,595 155,024 122,704 \$3,005,718 \$2,110,299 2: \$543,617 \$354,157 152,067 118,841 \$995,684 \$472,908	Earn. Exp. Earn. \$2,850,695 \$1,987,595 \$863,100 \$155,024 \$122,704 \$32,319 \$895,419 \$2.110,299 \$895,419 \$2.110,299 \$189,460 \$152,067 \$118,841 \$33,225

May, 1890 \$3,005,718 \$995,419 \$125,93 7,110,26 May, 1889 2,248,466 \$45,690 316 68 30 7,112,26 Increase \$757,252 \$409,729 \$106 \$57.63 dec. 1.45 Frisco system May, 1890 \$695,684 \$222,685 \$37.5 \$120.02 1,855.31 Increase \$133,669 \$43,277 \$72 \$23.33		At	chison syste	em.		
May, 1890. \$695,684 \$222,685 \$375 \$120.02 1,855.37 May, 1889. 502,015 179,408 303 97,69 1,855.37 Increase \$133,669 \$43,277 \$72 \$23.33 Aggregated general system. May, 1890. \$3,701,402 \$1,118,104 \$413 \$124.71 8,965.66 May, 1889. 2,810,481 665,098 313 74.17 8,967.66	May, 1890	. \$3,005,718	\$895,419	Gross earn. \$422	Net earn. \$125.93	Mil'ge. 7,110.23 7,112.66
May, 1890 \$695,684 \$222,685 \$375 \$120.02 1,855.37 May, 1889 562,015 179,408 303 97.69 1,855.37 Increase \$133,669 \$43,277 \$72 \$23.33	Increase				\$57.63	dec. 1.43
Aggregated general system. May, 1890 \$3,701,402 \$1,118,104 \$413 \$124.71 8,965.66 May, 1889 2,810,481 665,098 313 74.17 8,967.06		. \$695,684	\$222,685	\$375		1,855.37 1,855.37
May, 1889 2,810,481 665,098 313 74.17 8,967.00	Increase	A				
Increase \$390,921 \$453,006 \$99 \$50.54 dec- 1.43						8,965.60 8,967.03
	Increase	\$390,921	\$453,006	\$99	\$50.54	dec- 1.43

Baltimore & Ohio.—The syndicate which recently purchased the 32,500 shares of the common stock of the road owned by the city of Baltimore paid in the purchase money this week. The first instalment, amounting to \$1,024,800, was paid in Baltimore on Monday by Charles F. Mayer, President of the company, and the balance was paid in New York on the following day. It is stated that the company has made a new and close traffic agreement with the Pittsburgh & Western, making that line one of its principal western connections. The President of the Pittsburgh & Western is a member of the syndicate which recently purchased the common stock of the Baltimore & Ohio held by the city of Baltimore and the Johns Hopkins University. It is understood that negotiations have been completed between this company and the Northern Pacific, whereby the former is to run its trains from Whiting, Ill., over the Calumet Terminal and Great Western Terminal roads, now owned by the Northern Pacific, into the Wisconsin Central Station. The Baltimore & Ohio's present terminal is on the Illinois Central tracks on the lake front.

Chicago, Burlington & Quincy.—The May state-

Chicago, Burlington & Quincy.—The May statement of the company shows gross earnings of \$2,986,791, an increase over last year of \$373,041; net earnings, \$257,934; increase, \$157,076. The gross earnings for three months ending with May were \$14,196,441, an increase of \$1,533,975; net earnings, \$1,029,248; increase, \$987,710.

\$1,533,975; net earnings, \$1,029,248; increase, \$987,710.

Lehigh Valley.—The mortgage for \$15,000,000 on the New York roads of this company, which was referred to last week, bears 4½ per cent. Interest and will be payable in 50 years. It has been executed in favor of the Girard Life Insurance & Trust Co., of Philadelphia. The company will reserve \$600,000 of the bonds to take up a like amount of the first-mortgage seven per cent. bonds of the Ithaca & Athens, which are due this month. The balance of the issue will be used for the construction of the Buffalo & Geneva. Brown Brothers & Co., of New York, and Drexel & Co., of Philadelphia, have purchased from the company \$6,000,000 of these bonds, which will be all that the company proposes to issue for the present.

New York Central & Hudson River.—The earning

New York Central & Hudson River.—The earnings for the quarter and nine months to June 30 were as follows:

QUARTER	TO JUNE 30	la .	
Gross earnings Oper. expenses	1890.	1889.	Inc.
	\$9,151,073	\$8,746,667	404,406
	6,199,842	5,861,613	335,229
Net earnings	2,951,231	2,882,054	69,177
	1,965,420	1,963,260	2,160
Profit	985,811 894,283	918,794 894,283	67,017
Surplus	91,528	24,511	67,017
Nine months to June 30: Gross earnings Oper, expenses	1890.	1889.	Inc.
	\$27,256,105	\$25,951,035	\$1,305,070
	18,137,349	17,337,362	799,987
Net earnings	\$9,118,756	\$8,613,673	\$505,083
Fixed charges	5,896,260	5,889,780	6,480
Profit	\$3,222,496	\$2,723,893	\$498,603
Dividend	2,682,849	2,682,849	
Surplus	\$539,647	\$41,044	\$498,603

Sedalia, Warsaw & Southern.—Carlos S. Greely and J. D. Perry, of St. Louis, have brought suit in the Circuit Court of Pettis County against the company to foreclose a mortgage for \$338,000 and interest since May 1, 1880, at six per cent, per annum. The road is narrow gauge and extends from Sedalia to Warsaw, Mo., a distance of

Toledo, Peoria & Western.—Judge Gresham has granted a rehearing in the case of Brown & Paton against this company. This is the case in which the court held the Wabash, after the default, responsible for the full interest of the Toledo, Peoria & Western first-mortgage bonds under an agreement to pay the interest as rental for the latter's lines. The Wabash claims it is only liable for the interest as far as it can be met by the earnings of the road.

Union Pacific.—The preliminary statement of earnings for May shows an increase in gross earnings of \$59,546, the total earnings being \$4,043,415. Operating expenses increased \$875,768, making the increase in net only \$23,760. President Adams says the reasons for the large percentage of operating expenses are the additional fast mail and passenger service and the enormous expenditures for repairs to equipment.

GENERAL RAILROAD NEWS.

Atchison, Topeka & Santa Fe.—The gross earnings, operating expenses exclusive of taxes and rentals

Chicago Traffic Matters.

Chicago Traffic Matters.

The officials of both the Eastern and the Western railroads are in session to-day considering freight rates, but there seems little prospect of any immediate improvement. It is believed that secret reductions of considerable importance are still being made by several of the Western roads, and the Chicago & Alton insists that no formal advance shall be made until some more satisfactory means of maintaining rates shall be devised. A complete restoration of merchandise rates from Chicago to Missouri River points will be proposed and there may be some profitable discussion of details, but it is not likely that anything will be done about grain rates from the Missouri River.

The Wabash reduced the rate on dressed beef by way of the Canadian Pacific on Monday to 30 cents, and it is rumored that the Grand Trunk will follow this by announcing a rate of 27 cents though the official notice has not yet appeared. It appears that many of the lines are paying I cent a mile on refrigerator cars, and that contracts on this basis have been made in some cases for considerable periods. The prospect of any settlement of the war is therefore as far off as ever. The latest rate announced by the Central traffic lines on dressed beef is 30 cents to Boston, this being accompanied by a rate of 18 cents on live cattle.

It is said that the Lehigh Valley is taking considerable grain to New England by way of Slatington, Pa., and the Poughkeepsie Bridge. It goes to Buffalo by boat.

Judge Blodgett in the United States District Court rendered his decision last week in the case against the state of the case against the state of the case against the state of the case against the state of the case against the state of the case against the state of the case against the state of the case against the state of the case against the state of the case against the state of the case against the state of the case against the state of the case against the state of the case against the state of the case against the state of the c

ble grain to New England by way of Siatington, Pa., and the Poughkeepsie Bridge. It goes to Buffalo by boat.

Judge Blodgett in the United States District Court rendered his decision last week in the case against the Michigan Central and certain of its officers for carrying corn to New York at 18.2 cents when the tariff was 20 cents. Messrs. Somers and Nicholas were discharged, the evidence being insufficient to convict them. Mr. A. W. Street was fined \$3,000, to be paid within 60 days. Judge Blodgett said that this being a criminal proceeding, he could take nothing by inference. The government must prove every allegation of the indictment beyond reasonable doubt. He referred to the phrase in the act of Congress providing that any railroad employé "who shall willingly suffer or permit" an act in violation of the law shall be deemed guilty, etc., and said that to sustain such a charge there must be proof beyond reasonable doubt that such person knew of the original scheme to violate the law, and that a subordinate could be held accountable for allowing it to go on only in case he knew of its fraudulent character. A subordinate working under instructions might suffer acts to be done or aid and assist in doing acts in violation of the law, but the proof must show clearly that he had positive knowledge of the wrong intended. On these considerations Messrs. Somers and Nicholas were discharged.

Traffic Notes.

The railroads centering in Baltimore have agreed to establish a demurrage bureau in that city.

The fare from Denver to Ogden has been reduced from \$29 to \$24 by all the lines.

It is said that the lines between Kansas and Texas have agreed to restore, on July 15, the rates on grain and flour, which have been badly cut for several weeks.

It is said that the Iowa roads have entered into an agreement to ignore the law which goes into effect July 4, requiring the establishment of joint through freight

The Merchants and Manufacturers' Association of Baltimore has issued a circular guaranteeing all merchants from the South and West traveling on limited New York tickets to furnish in exchange for the Baltimore and New York coupon an unlimited ticket between those two points.

tween those two points.

The Trunk Line Presidents met in New York last week and discussed the irregularities in rates on dressed beef and the need of revision of some other features of the through freight tariffs, but the meeting seems to have had no definite result other than the sending of a resolution to the roads of the Central Traffic Association. On Tuesday of this week the Passenger Committee considered the vexed question of immigrant business, but no conclusions were reached.

mo conclusions were reached.

Mr. John C. Haddock, a coal operator in the Wyoming (Pennsylvania) coal region, has formulated a complaint against the Delaware, Lackawanna & Western concerning discrimination in the rates of transportation on coal, similar to that entered before the Interstate Commerce Commission by Coxe Bros. & Co. against the Lehigh Valley, which has been pending some time, and has not yet been decided by the Commission. Mr. Haddock avers that the railroad buys coal from miners at \$2 per ton and sells it in New York at \$3.50, thus deriving only \$1.50 per ton for transportation, whereas Haddock and all other individual operators are charged \$1.50 per ton for transportation. He also claims that the rate of freight on pea and buckwheat sizes and culm is unreasonable and unjust.